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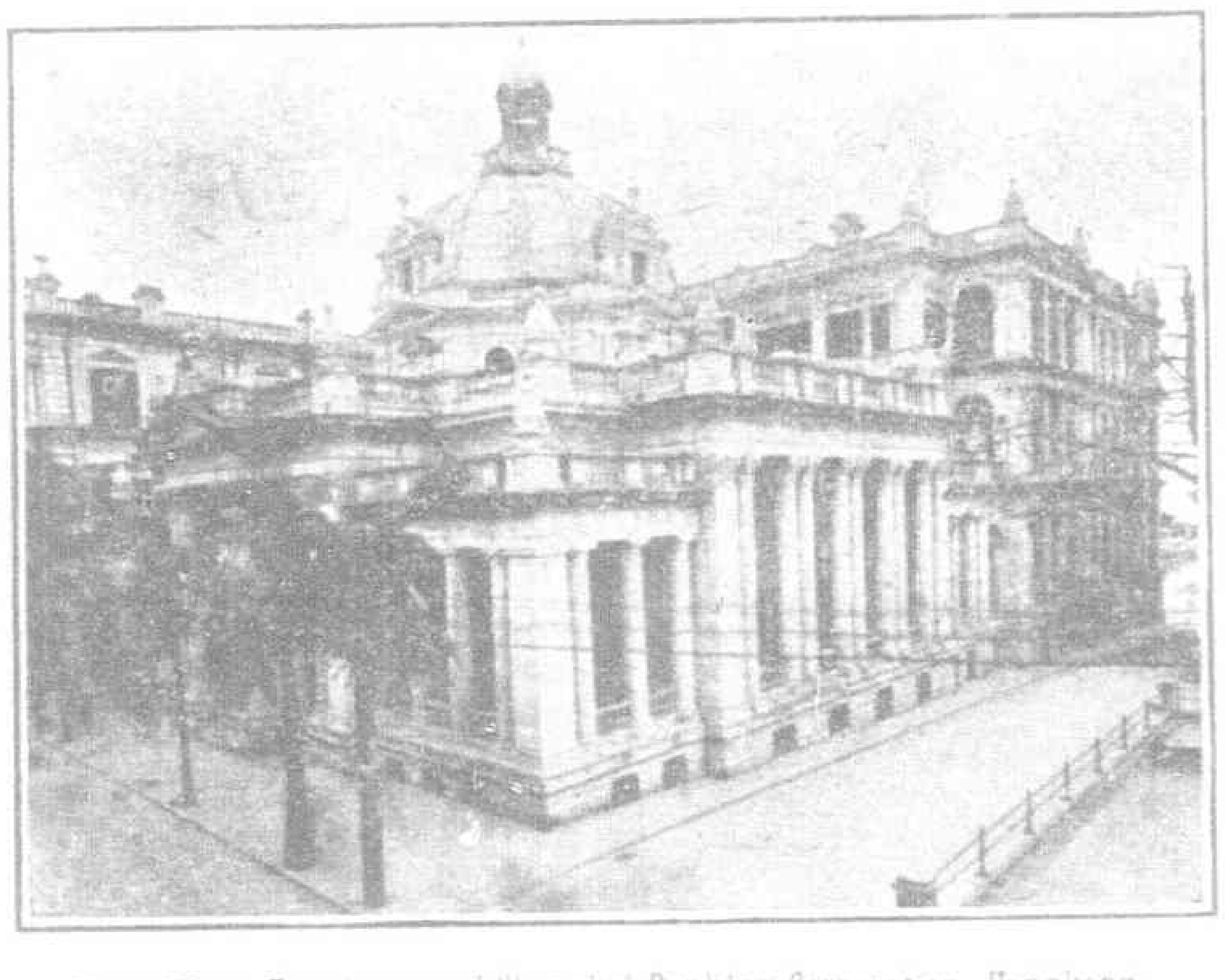

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THE FAR EASTERN REVIEW
COMMERCE ❂ ENGINEERING ❂ FINANCE

VOL. III. MANILA, P. I., SHANGHAI, AND YOKOHAMA, JULY, 1906. No. 2.

GENERAL INSTRUCTIONS FOR LOCATING ENGINEERS

(By E. J. BEARD, C. E., Chief Engineer, Philippine Railway Company.)

The general instructions to the engineers engaged on the surveys of the routes in the islands of Panay, Cebu and Negros, Philippine Islands, for the proposed system of the Philippine Railway Company, issued recently by Mr. E. J. Beard, C. E., chief engineer, are quite likely to prove of great general interest to those members of the profession who are studying or carrying on railway construction work throughout the Orient. The chief engineer deals concisely with all features of the problem. He condenses into a most readable circular all of the best features of modern railway surveys, in addition to which he includes many excellent ideas of his own which have been developed by long practical experience in this particular branch of civil engineering. The instructions are accompanied with drawings which illustrate the most important branches of the work, and are as follows:—

Sec. 1.—Chiefs of locating parties and their subordinates will be guided by the following letter of instructions, to be supplemented from time to time by such additional instructions as may seem necessary. Chiefs of party are requested that, on receipt of such supplementals, they attach them to this letter and keep the whole on file in their office accessible to all employees and other parties concerned.

Sec. 2.—Chiefs of party are expected to see that their parties are sufficiently supplied with instruments, tents, stationery, provisions, and all other tools and outfits needed for the proper and vigorous prosecution of their work. They will be held responsible for the competency and sobriety of each member of the party. They will see that instruments are kept in adjustment, and all possible checks are made on the accuracy of the work.

Sec. 3.—The determination of the maximum curve and ruling grade depends on what the preliminary surveys develop; the least rate of each is desired consistent with all the conditions imposed by density of traffic and cost to obtain, and as rapidly as these factors are ascertained for each line they will be determined by the chief engineer; until such time, it is the duty of each chief of party to show his ability in that direction.

Sec. 4.—Topography will be taken 300′ on each side of all preliminary lines, and, after being plotted, the best location obtainable within this field of topography projected on the map, hence the preliminary lines are, as a matter of fact, merely base lines from which to secure the topography of a 600′ belt of country, within which it is expected the proper location will lie; therefore, no expenditure in time cost should be made to have the preliminary lines lie along the final location. At the same time, skill should be employed and will be shown by placing them as near the finally determined location as possible, for the system of taking topography required diminishes its accuracy the farther it lies from the preliminary line. Parallel preliminary lines within 400 feet of each other, or the backing up of a line to place it within that limit, are unnecessary and here considered bad practice.

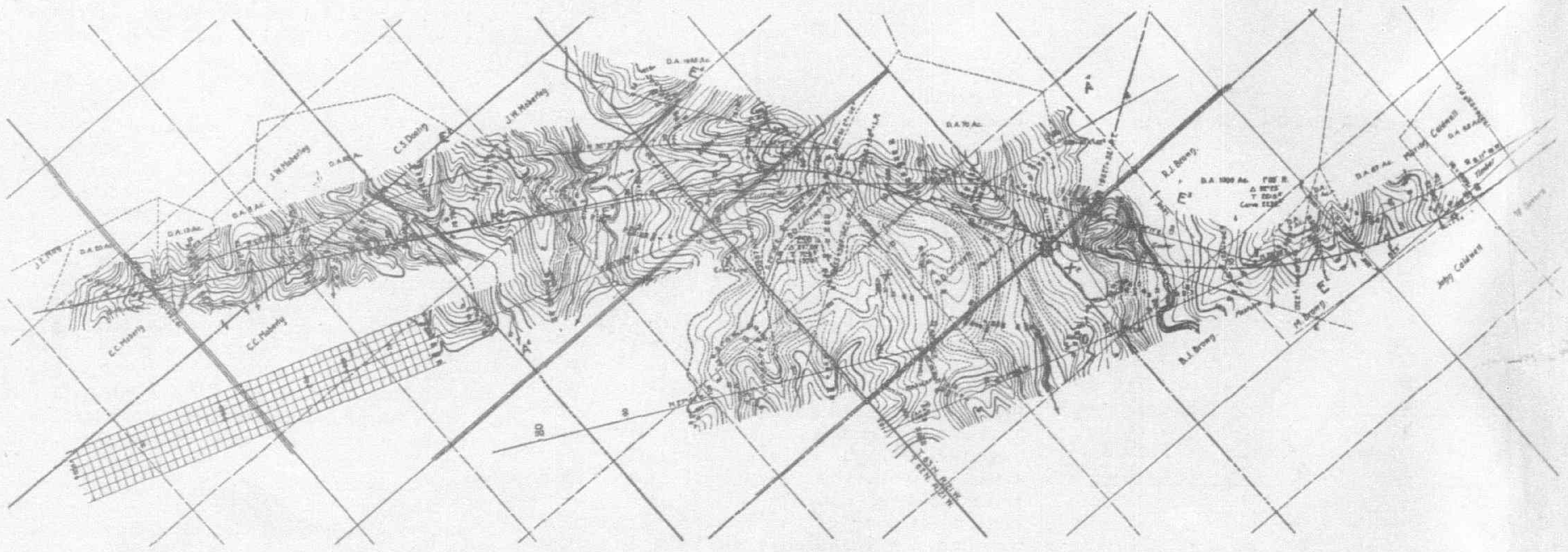
On preliminary lines all important streams will be meandered for some distance above and below the crossing of the line. This meander line can be frequently run up the bed of the stream and both banks located from one line by off-sets.

Sec. 5.—The 300′ of topography—to be taken on each side of all preliminary lines, as per *Sec. 4*, will be taken their full length and shown in field notes by 5′ contours; to be taken in the field with a hand level, considering the topographer's eye as always 5′ above the ground. The use of a 5′ stick on which to rest the level is prohibited. Usually distances out will be obtained by stepping, and taping in is only necessary on very steep slopes. The topographer will sketch, in all topography taken in the field, to a scale of 100′ to the inch, on standard cross-section sheets 6″×8″, or in a standard cross-section book. Topographers will take care to obtain sufficient information at the angles in the line to properly connect contours on the office map. It is suggested that the topographers work one day behind the level party, when each evening they can take station and plus of every 5′ contour crossing, directly from the preliminary profile, then, when in the field, they can readily start off the centre line with their feet on a contour where it crosses, thereby simplifying their work.

The topographer must obtain all improvements within the belt of topography being taken, and, in case of buildings, note their approximate value. He will note the station where the line leaves timber land and enters cultivated land, and vice versa. The distance to buildings from preliminary lines should be stepped and recorded to the two corners of the long side towards the line, and these two distances taken at right angles to the preliminary line, giving the station of each.

If the topographer is unable to keep up with the progress of the party it will be found good practice, before moving camp, to break the entire party into small topographical squads and bring the work up to date. This tends to school all the men in the art of taking topography.

(Continued on page 37.)



SPECIMEN OF STANDARD TOPOGRAPHICAL MAP.
Reduced from an original 400-foot map.

THE FAR EASTERN REVIEW

GEO. BRONSON REA, M. E.
PUBLISHER AND EDITOR

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MANILA, SHANGHAI AND YOKOHAMA, JULY 1906

JAPAN'S MANCHURIAN POLICY.

We publish elsewhere in our columns the full text of the Imperial Japanese Ordinance creating the Chino-Japanese Development Co., Ltd., for operating in Southern Manchuria. The document is a powerful argument in support of the persistent contention that Japan is not sincere in her oft repeated declarations that the province of Manchuria will be thrown open to the trade of the world, and when we further absorb the true significance attached to the amalgamation of the cotton piece goods manufacturers in Japan, it is hard to see how any explanation can clear away the above impression.

Japan may be acting in entirely good faith, in fact we have her oft repeated assurances to this effect, but nevertheless actions speak louder than words, and indicate the trend of her policy more effectively than studied diplomatic phrases.

The Chino-Japanese Development Company is a misnomer,—a blind to disguise the true [illegible] of the enterprise. The government appoints all the officers, fixes their salaries and holds the power of removal. No foreigner can hold shares in the enterprise, indicating the purpose of a cast iron monopoly for a favored few. In fact it is merely a thinly disguised department of the Imperial Government, on the lines of the many semi-official enterprises of the empire.

The official programme mapped out for the control of South Manchuria, as indicated in the provisions referred to, is exposed to the lime light of publicity by the immediate campaign of the cotton goods manufacturers to seize the markets for Japan. After forming a guild for the exploitation of this market, naming the Mitsui Bussan Kaisha as their selling agents, the five textile companies appealed to the government for a loan of 6,000,000 yen, and for the free transportation on the Japanese controlled railway in Manchuria, or at least half rates, and a further demand of a half reduction on the ocean freights of the Japanese subsidized lines.

How this propaganda is consistent with the polite assurances of good faith it is difficult to conceive.

GRAFT IN CEYLON

According to the London *Truth* a huge political "graft" has been discovered in connection with the Pearl Fisheries of Ceylon, one of the principal sources of revenue for the Colony. It seems that up to 1902 the industry was carried on in an unscientific and wasteful manner, when the Governor of Ceylon, Sir West Ridgeway, engaged an expert to make a thorough study and report on the fishery. The result was that certain laws were enacted, which increased the revenues from this source, rising to Rs. 8,29,348 in 1903, and a further increase of two lakhs and a half the following year, while last year the revenues rose to Rs. 25 lakhs.

It is charged that shortly after his retirement from the governorship of Ceylon, which took place in 1903, Sir West Ridgeway formed a syndicate and suceeded in inducing Mr. Lyttelton, the late Colonial Secretary, to grant a lease of the fisheries to the syndicate for a term of twenty years, at a rent of Rs. 3,10,000 per annum. Or, in other words, the syndicate was to pocket annually a sum of not less than twenty lakhs and the Ceylon Government was to get only three lakhs!

Truth says that it is as patent as the sun at mid-day that Sir West Ridgeway had made use of information, which he had derived in his official capacity as Governor of Ceylon, in order to rob the Ceylon Government to the tune of twenty lakhs per annum and to enrich the syndicate, which he had formed and of which he is perhaps the most important member.

This means diverting about $650,000 gold into the pockets of the syndicate, at the expense of the Ceylon taxpayer, and, as an example of high class crookedness, is on a parallel with the recent land frauds in the United States, which resulted in the conviction of one of the Senate. We wonder whether his Excellency Sir West Ridgeway will be called upon to explain.

FILIPINO LABOR FOR HAWAII

One of the main arguments in opposition advanced by the beet sugar lobbyists in the hearings before the House and Senate Committees on the Tariff Bill, was based on the alleged enormous available labor supply of the Islands, and the miserable wage of six cents per day at which it could be employed. This phase of the argument assumed considerable importance in estimating the future cost of production and the final cost of sugar laid down at the competing point of the Missouri River. To offset this, it was necessary to prove that granting the existence of this great supply, it could not be moved around and made available. On this point Mr. Rea made the following pointed remarks:—

> "Our friends of the opposition, who are so worried over the future of the poor Filipino, who express such benevolent and altruistic views for his emancipation, and who see over there in jungles of those far-away islands millions of future serfs for the cane-sugar barons, why don't they put into practice what they preach? If they are in earnest about their salvation, why don't they go over and secure a few thousand to work their beet fields and release our own race from the degrading yoke? There is no law that I know of against the importation of Filipino labor, so the altruistic beet, the enterprising Hawaiian, and Louisiana planter can surely have no objection nor find any difficulty in solving their troubles. They say the labor is there in abundance, despite all that others have said to the contrary. All right, I answer, more power to you, go and get them; you need them in your business. Why don't they try? We have tried. We have tried to induce them to go from one province to another and fialed. We have shown those who were starving in Cebu that they could earn $2 gold per day in the hemp fields of Sorsogon; we have offered two months' pay in advance to entice the *Tao* from his nipa shack in Capiz to the cane fields of Negros; we have sent out men in the provinces of Pangasinan, Isabela, Nueva Ecija, and Pampanga to enlist laborers for the Benguet road, and we have failed to budge him away from his guitar and his vino. But we don't know anything over there. We Americans are not up to the ways of the natives. No, only the American beet sugar men know what they are talking about; they know better; they can do what we failed to do. Well, there's the islands, there's the labor, and here's the demand. Why don't they try? Mr. Hatch, representing the Hawaiian planters, when asked the question, condescended to honor us who know by stating the Filipino would not leave home. We told him that—he don't know it from his own knowledge. Let him try.
>
> Maybe, gentlemen, the future will show that we, exiled Americans in the far-away islands, know what we are talking about."

It had been previously pointed out that the main deterrent factor to the development of the sugar industry in Hawaii, Louisiana and the American beet fields was the lack of cheap and efficient labor. The Hawaiians had turned as a last resort to the introduction of labor from Europe. They had already experimented with all kinds of cheap and coolie labor, embracing Kanakas, Chinese, Koreans, Japanese, Portuguese, Porto Ricans, Russians, and some Malays, but could not succeed in keeping a full supply at work.

It would appear that the suggestion of Mr. Rea was immediately grasped by the Hawaiian Planters' Association for within a month after the publication of the Hearings, we find that they had determined to experiment with Filipino labor, appointing Albert F. Judd, a young lawyer of prominence, and cousin of Governor Carter, as their commissioner to go to the Philippines.

Notwithstanding the statements made that the Filipino is not a very good laborer, that he is not inclined to labor consecutively, and that the Philippines need the Chinese as laborers, the Hawaiian planters, after considerable investigating, came to the conclusion that the Filipino can be made an important element in their supply of labor. They believe that, separated from his accustomed surroundings, where the habits of life and customs of centuries conduce to a low standard of living, in which there is no incentive either to large earning capacity or to thrift, and placed in new surroundings where he will be in contact with a new and higher plane of living, he will acquire habits of more continuous industry and thrift.

Mr. Judd has since reached the Islands and is endeavoring to secure 200 families as an experiment, but has met with opposition from some of the native papers who are concerned about the preservation of the Filipino soul and advise their countrymen against accepting his overtures. In this they are again delaying the future happiness and prosperity of the people they are attempting to represent.

As indicated in the testimony of Mr. Rea before the Senate Committee, one of the greatest difficulties to be faced in the future development of the Philippine sugar industry, is the absolute lack of skilled labor and mechanics conversant with modern methods. Under our present laws, a new company would be forced to the necessity of importing their skilled help for a long time from other sugar producing centers under the flag, or from Hawaii, Louisiana or Porto Rico, at a higher salary and passage guaranteed both ways, thus greatly increasing the cost of production.

Modern methods of cultivation and manufacture are unknown in the Islands, and it will take years to educate the native up to the standard required.

We have an abiding faith in the ultimate passage of the Tariff Bill, and sooner or later justice will be accorded the Islands. It may be delayed for a year or so, but its final passage must come if we are to retain control of the Islands. After its enactment into law, it will take at least three years for new enterprises to take off the first crop, or some five years hence before the advantages of the Bill would be apparent, granting its passage this next session.

The needs of the Hawaiians, even though they opposed our Bill, might with proper regulations be turned into profit for the future advancement of the Insular industry, and harmonize with the policy of the administration of the Philippines for the natives.

The Hawaiians need plantation hands; two hundred families would not impair the labor supply of the Islands. Pending the passage of the Tariff Bill, and the ensuing period before modern factories could get to work, it would seem that our future industrial interests could be advanced if the Government could officially indorse this movement, and regulate the system by certain provisos that would redound to our own benefit.

For instance, the Insular Government could sanction the exportation of a limited number of Filipinos for work in the Hawaiian plantations, on the condition that a certain percentage, say one out of every five, be apprenticed to work in the various positions in the sugar house, so as to learn the manipulation of the many new machines employed in the process of manufacture, and that a similar proportion be accorded equal opportunities in the fields.

In the course of two or three years there would be created a force of intelligent sugar house employees, fully understanding the duties required of them. If by that time the Tariff Bill has become a law, and capital induced to enter the Philippines there will be a supply of skilled mechanics and help to draw upon, who would be only too willing to return to their native land under similar employment and wages, and would be the nucleus to instruct and train other natives for the future requirements of the growing industry, thus obviating the alternative of importing outside help. This fact would be an added incentive for capital to invest more rapidly in the Islands.

If there is no restriction on the emigration of Filipino labor to other parts of the United States, the Hawaiians will be to a certain extent successful in their undertaking, as there is no law to prohibit them, and to achieve the most benefit to the Islands from what they do succeed in doing, the foregoing suggestion is worth consideration. An inspector could be appointed by the Insular Government to reside in Hawaii and see that the terms of the contract were duly carried out.

FAR EASTERN DOCKS

Commercial Intelligence publishes an interesting article on the docks and shipbuilding of the Far East, and, after a long description of and praise for the Japanese yards, has the following to say anent the British enterprises of the mainland.

> "A striking fact about the Japanese shipbuilding and dock concerns is that they are all capable of accepting and carrying out building contracts of considerable magnitude, which is not the case with any other concern anywhere East of Port Said. Of course, they have to import a considerable amount of their material, but so have the others. There appears to be considerably more technical knowledge and skill in the private yards of Japan than in any of the concerns working in the British possessions of the East or in China. What is more, the class of material purchased in Great Britain by the Japanese yards is far higher than is the case with similar concerns at either Singapore, Hongkong or Shanghai.
>
> In view of these facts, it is difficult to see anything bright in the prospects of those dock companies working in the Hongkong or Shanghai, and I must again very strongly advise British investors to abstain from providing capital for any such concern that is likely to be offered in London."

There is an evident bias in the above remarks and an unfair reflection on the skill and knowledge of the technical staff of the British concerns. That a Britisher should voice the opinion that there is more technical knowledge and skill in the private yards of Japan than in the establishments at Singapore, Hongkong, or Shanghai, shows to what extent some English writers will slop over in their fulsome praise and adulation of their allies. When we remember that Britain has excelled the world in shipbuilding, and some of her best men have created the industry in the Far East and have brought it to its present prominence, the reflection on such engineers as Dixon, Nicholsen, Danby, Wilson, Twentyman, and others is decidedly uncalled for. It is quite evident that the writer has assumed this superiority of the Japanese over his own countrymen, on the fact that the Japanese yards have turned out and equipped some larger ships than the other yards of the East.

His is merely a circumstance of accident and location, where the Japanese Government have purposely encouraged the building of certain vessels in her own yards under the supervision of her foreign trained shipbuilders. While admitting the imitative skill of the latter, we cannot indorse any opinion which places them in a superior position to the type of British Engineers who have managed the other enterprises in the Far East. If these had the same opportunity to build the larger ships, there is no doubt about their ability to carry out the contract successfully and with superior intelligence.

As to the class of material purchased for Japan being better than that supplied to the other Far Eastern companies, it follows naturally after the above explanation that the Japanese have been ordering higher grade materials for the construction of the many war vessels now under contract. The majority of this work could have successfully been carried out by two or three concerns on the China Coast, if political influences had not sent the orders to Japan, in which event the statement would have been reversed.

There is one point, however, in the article referred to, which bears considerable weight, and though it smacks of stock jobbing or an attempt to "bear" the shares of the Coast concerns, the statement has some foundation.

"It is difficult to see anything bright in the prospects of those dock companies working in Hongkong or Shanghai," states our contemporary, and, as a matter of cold fact which has to be faced, the truth of it is apparent.

No other industrial enterprise has experienced such a boom in this part of the world, as docking and shipbuilding. In regard to the docks at Hongkong, where up to the present they have had a complete monopoly, they must shortly face a severe competition. The completion of the big Admiralty Dock will divert the docking and repairing of British naval vessels; the immense new dock at Quarry Bay will make further inroads on their old business, and the arrival at Manila of the big floating dock "Dewey" will keep American naval vessels away from the coast. In Shanghai, during the past year, the Kiangnan Arsenal dock has been converted into a commercial enterprise entering as a stiff competitor for the work at that port, formerly monopolized by Farnham, Boyd & Co., and now the Japanese Kawasaki Dock Company has publicly stated its intention to also establish works at that port.

The Mitsu Bishi, Kawasaki, Uraga and Yokohama Dock Companies, the Osaka Iron Works and other smaller concerns in Japan are all reaching out, and advertising for business in China and the Far East, and evidently mean to get it.

In addition to the larger enterprises on the China Coast at Hongkong, Shanghai and Singapore, all the secondary ports now have their own docks and shops for handling the local and coast trade.

With the entrance of the Japanese into the field, adopting modern pushing business methods, and a determination to succed, it behooves the older firms in the mainland to throw off some of their insular conservatism and face the issue, fighting the competition with their own tactics. Otherwise, the inevitable loss of business, and consequent shrinkage of dividends and value of their stock will follow.

The correspondent of the *Commercial Intelligence* has evidently had this in mind, in warning home investors against providing capital for docking enterprises in the Far East.

SHIPBUILDING IN MANILA

Elsewhere in our columns we publish the description and views of an old established shipbuilding and engineering concern, and in future issues we will also devote space to similar enterprises of the Islands. All that is needed to resurrect this important industry is adequate patronage and assistance from our home interests.

There is little doubt but that with some adequate protection, a flourishing industry would develop in Manila, from the now struggling engineering enterprises like the Varadero, San Nicolas Iron Works, Manuel Earnshaw & Co., and others, but with the present tendency and policy of the authorities which permit this work to go to foreign ports, they must eventually perish.

The great increase in wages since the American occupation—apparent in all branches of industry—and the high tariff charges increasing the value of material, practically prohibit any competition with the China coast shipbuilding firms, enjoying the double advantage of free material and coolie labor. In Hongkong, a good boilermaker, commands a daily wage of seventy cents mexican, while here in Manila, the same Chinese mechanic refuses to work for less than ₱4.00 to ₱4.50. The laws in force prohibit the importation of Chinese laborers or mechanics, so there is no remedy for the high wages imposed on the local enterprise.

Our laws are so constructed that, with the high tariff and exclusion, local firms cannot compete, and, while there appears to be sufficient justification for their application as they stand, there is certainly no justification or excuse for the conditions which permit an apparent evasion of the law. We impose the tariff for revenue and exclusion for the protection of the native worker, but we ignore the provisions of these measures by permitting vessels to proceed to Hongkong for their repairs, where the owners receive the benefit of the tariff and the cheap labor, and return to this their home port free of any charges. The government is cheated out of its lawful revenue which would otherwise have accrued to the Treasury, and the engineering firms who pay their quota of the taxes are deprived of the work and incidental profits on which they exist. Firms who invest their capital in such enterprises in Manila naturally hope to secure the local patronage, otherwise they might just as well locate in Hongkong and help swell the treasury of that colony with their taxes.

This phase of our industrial situation is one demanding immediate attention and some scheme devised to foster our own enterprises. The Government should take the matter under prompt consideration as a means of saving and developing an important source of revenue.

Conditions which permit local firms to contract for several wooden lighters for the use of the U. S. Navy and then sublet them to foreign companies, where cheap labor and free material are available, demand immediate attention. The Government itself has taken the lead in diverting this great business to foreign ports. Estimates are asked from local firms, and at the same time they are informed that they will have to compete with foreign firms.

If the finished foreign product enters free of duty, how on earth can the local firm, who pays the duty and his taxes hope to underbid such competition. How can a vessel built in a foreign port legally float the United States flag?

In all fairness and equity, the local yards should be given an opportunity to develop. With the assurance of protection, the plants would be immediately enlarged and brought up to a plane where they could cope with more important work and gradually establish an independence from foreign competition. As it is, without this protection, they are afraid to invest capital in improvements which would mean a total loss if conditions are unchanged. This attitude is entirely justifiable from their standpoint, as a result of past experience, for in prospect of securing the orders for the construction of the

Coast Guard cutters, the Varadero spent ₱15,000 in a new shear and punching machine. As the bids from China and Japan were accepted, this investment represented almost a total loss, as the class of work remaining for them to pick up did not necessitate the use of such large and expensive machine tools.

Protect and help our local firms, and it will give an impetus to other lines of industry. We need the money here. The Government needs its revenues, the engineering firms need the business to save them from being wiped out, and the allied commercial interests all need their quota of the golden stream, which flows steadily over to China.

Keep it here!

UNITED STATES COURT FOR CHINA

The appointment of the Hon. Lebbeus R. Wilfley to the position of Judge of the United States Court for China comes as a distinct surprise to many in the Far East, but must meet with universal approval. The necessity of creating this post and relieving the arduous duties of our Consul General at Shanghai, has been urged by all the American interests of the East for some time, and it is a distinct recognition of the growing importance of our influence in the Far East that a jurist of the high standing of Mr. Wilfley has received the first appointment.

The post was created under the provisions of our new Consular Bill, and carries with it a tenure of office of 10 years, and a salary of $8,000.00 gold, with an allowance of $10.00 per day travelling expenses. The Court has original jurisdiction in all cases now tried before the American Consuls in China, except small civil and criminal cases which are still under the jurisdiction of the consular courts, but having the right of appeal to the United States Court at Shanghai. The Court will sit at Canton, Hankow, Tientsin, Pekin, Chefoo and other Consular ports as cases demand.

In his official capacity as Attorney-General of the Philippines, Mr. Wilfley has gained the confidence and approval of the Administration, and it was on the recommendation of the Honorable Secretary of War that the President and Secretary Root offered him the post by cable.

"WHO'S WHO IN THE FAR EAST"

We have received from the publishers a book with the above title, and welcome it as a valuable addition to our reference library. Compiled on the lines of the older and standard works of the same nature, the present production, covering as it does all the notabilities of the Far East, including the prominent Chinese and Japanese officials and men of note, it deserves commendation. The failure to include references to Americans in the Philippines will undoubtedly be remedied in the following succeeding issues.

Who's Who in the Far East, published by THE CHINA MAIL, Hongkong. Price $10.00 (silver) net.

JAPANESE OFFICIAL INTERFERENCE IN PRIVATE BUSINESS.

The *Moji Shimpo* has an article in which it condemns the growing tendency on the part of the Government to interfere in private enterprises. The evils of bureaucracy have long been existing in Japanese official circles, says the journal, and in the desire to extend their influence the officials are making pernicious interference in private business affairs. This tendency has been more marked in connection with the Department of Finance, which, owing to the peculiar nature of its business, has been comparatively free from outside influence. Thus, the monopoly of tobacco and salt has been carried out regardless of the decline of private business, and endeavors are also being made to apply similar measures in respect to other trade. These measures, though carried out ostensibly for financial reasons, are, as a matter of fact, aimed at the extension of official authority. When a revision of the Bank regulations is mooted

(Continued on page 50)

SIAM STATE RAILWAYS

Opening of Tenders.—The Royal Railway Department is this year calling for tenders for a quantity of rolling stock, amounting to 339 vehicles with spare parts. The tenders for ballast waggons (items 15 and 16) were publicly opened this morning at the head office of the Department in Bangkok. The Director-General, Mr. L. Weiler, opened the tenders in the presence of representatives of the Bangkok firms that had tendered, and others. Item 15 was 100 ballast waggons without brakes and item 16 was 20 ballast waggons with brakes. These have to be delivered in Bangkok in 10 months after the order is given. The tenders were opened in the following order, the prices being per waggon in £ sterling:—

	Item 15	Item 16
A Diana & Co., Bangkok.	108	120
Usine de Brainc-le Comte, Belgium	113	137.10
Nesselsdorfer Wagenbu Fabrik Gesselschaft, Vienna,	108	132
E Bock, Bangkok	105	128.10
Denny Mott & Dickson Ltd. Bangkok, for the Metropolitan Amalgamated Railway Carriage and Wagon Co. Ltd., Oldbury, England	174.14.7	197-19.2
G. Kluzer & Co., Bangkok	122. 4	158. 1
B Grimm & Co., Bangkok	164	191
Windsor & Co., Bangkok, for Van der Zypen und Charlier, Koln	124	141
Clark & Co., Bangkok	187. 2.3	211. 7.3
Clarke & Co., Bangkok, for Société Anonyme Franco-Belge La Croyee	117. 7.6	138. 3.6
Howarth Erskine Ltd., Bangkok	130.12.6	148.10.6
(For ordinary steel prices to be reduced £12 per waggon)		
Soc. Anon. des Ateliers Germain Monceau, Sambre, Belgium,	130. 4	151.13
Soc. l'Industrie Soc. Anon., Luvian, Belgium	115.14	131.18
Baume et Marpent, Haine-St. Pierre, Belgium	139	159
do. (But with the quality of steel specified for the Belgium State Railway	127	147
Les Ateliers du Boeulx, Belgium	121	140
Slaudinger Wagon Fabrik, Vienna	124. 6	145. 6
Huret Nelson & Co., Ltd., Motherwell	135	160

By Telegram

	Item 15	Item 16
Kalt Weiss, Siegen, Germany	130	150
Les Ateliers Métallurgiques, Brussels	128	145
From England, telegram unintelligible	—	—
Nederlandsche Fabrik von Werktuijen und Spoorwej, Amsterdam	140	165
Dick Kerr & Co., Ltd., London	205	227
Mendelson, Tokyo	255	280
Forge, Leeds	154	197
American Car Foundry Co., New York	171	no price
Brnsh Electrical Engineering Co., Ltd., London	126	146
Nesselsdorfer Wagenbau Fabrik Gesselschaft	120	150

There are thus tenders from seven Belgian firms, seven British, three Austrian, three German, two Italian, one Dutch, one Japanese, and one American.

The lowest tender would thus be that of Mr. E. Bock, £13,070; and the next that of Messrs. A. Diana and Co., £13,200. The highest runs to £31,100.

COTTON MILLS AT SHANGHAI.

Mr. Jotaro Yamanoto, acting director of the Mitsui and Co., states in the *Chugai Shogyo*, about the cotton mill sat Shanghai, as follows:—

The cotton mill business in Shanghai is making a fair progress. At present the spindles in Shanghai number about 300,000, of which 100,000 are owned by the Chinese, 100,000 by the English, 50,000 by the Japanese and 40,000 by the Germans. The cotton mills are representative of the different countries' business interests in China, in regard not only to cotton mill business alone, but to industry in general. Judged from the results of investigations carried out in the past four or five years, the cotton mills worked by the Japanese compare favorably with those of other nationalities. As a cause of the superiority, it may be said that the community of letters used by the Japanese and Chinese and the similarity of their thoughts in the main, make it easier for the former to control the Chinese operatives than for other nationals. We have been in consequence able to dispense with compradores and save their commissions. Our concerns therefore have succeeded to pay a handsome amount of dividends and to set aside reserve funds, while almost all hose belonging to other nationals had to go without paying any dividends since the establishment of their concerns.

It is again an undeniable fact that the Chinese have come to recognize the industrial ability of the Japanese. Of late they have been scheming to organize three or four cotton mills, and it is the uniform desire of promoters to engage Japanese engineers and experts for their factories. A similar tendency is to be observed in connection with other industrial enterprises taken up by the Chinese.

The sorts of cotton yarns demanded in China are varied. Manchuria demands 10-hand, Shanghai 14-hand, Tientsin and Chefoo 16-hand, and Szechuan 20-hand, while India supplies 10-hand and 20-hand and China 14-hand. Cotton yarns made in Japan sold well this year.

The sale of cotton yarns varies according to their sorts and to the places where they are sold. Formerly Japanese yarns were quoted below or equal to Indian yarns. At present, however, the Chinese have come to admit the superiority of our yarns in quality. They are therefore quoted five or six taels above Indian yarns. At Tientsin, Chefoo, and Hankow, our 16-hand yarns, dearer as they are than Indian yarns, can command the market. But Szechuan prefers inferior and cheaper 20-hand sort. It is, however, desirable that our cotton mills should strive to maintain the good quality of their yarns.

The trade in general at Shanghai is most active at present. The large sum of money spent there by the late belligerents have greatly increased the purchasing power of the Chinese. A large amount of cotton yarns and cotton goods was exported from Japan to Shanghai during the war, and it is quite reasonable to expect that the trade will continue to prosper for the future.

THE ANGLO-JAPANESE BANK, LD.

This bank with a capital of £2,000,000 in 200,000 shares of £10, announces an issue of 100,000 shares at par. The company has been formed as a joint stock bank, with heead office in London, to "carry on all discriptions of banking business in the large field for commerce now open and rapidly extending in Japan, its dependencies, Korea, and the Far East, adn elsewhere." The success of such a venture of course, depends entirely on this future management, and its shares can, at present, only be regarded as an interesting speculation. The board is a very strong one.

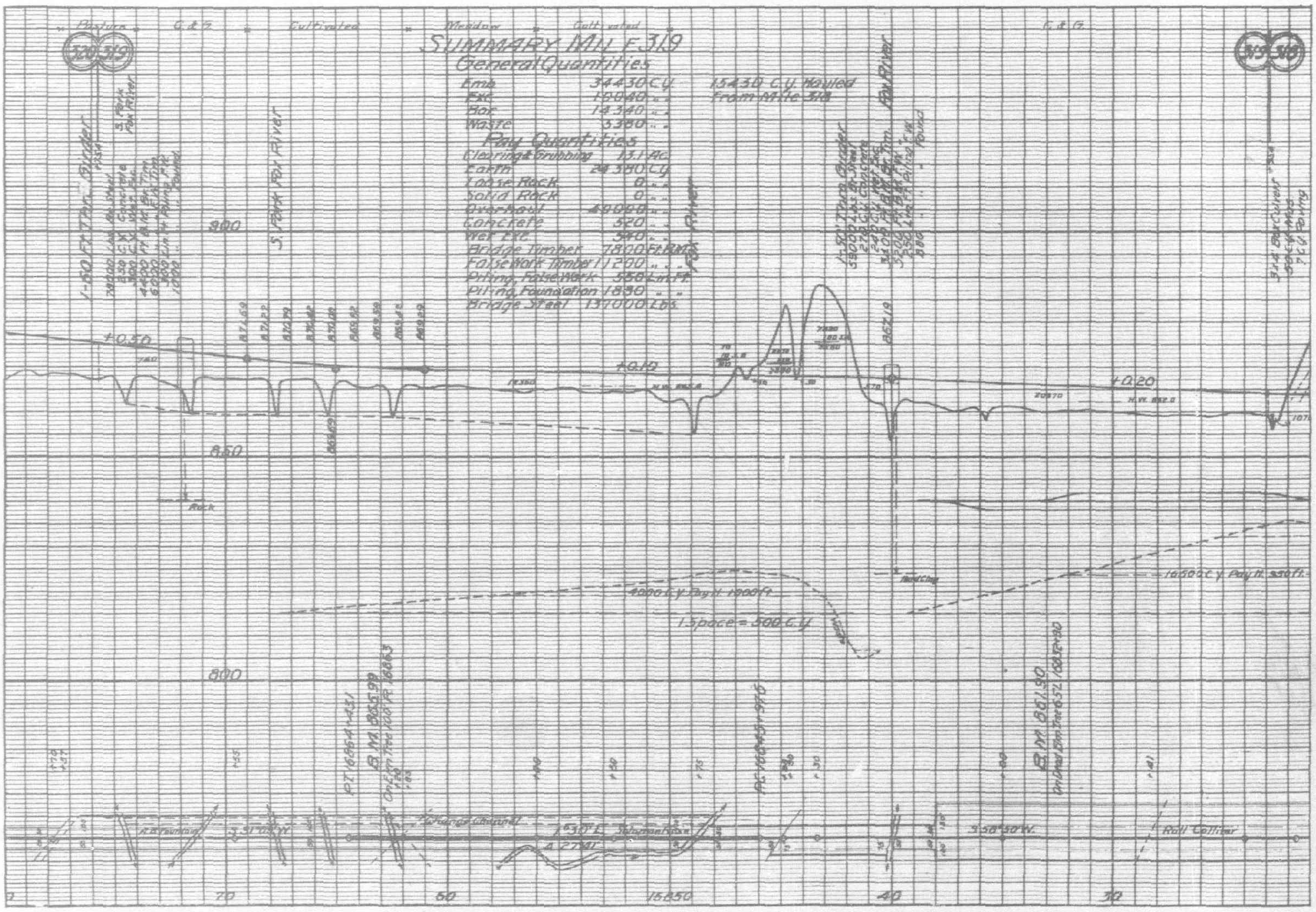
GEN. INSTRUCTIONS FOR LOCATING ENGINEERS

(Continued from page 33.)

Sec. 6.—The chief of party will give special attention to the determination of the necessary length of bridges and size of culverts; that is, the water discharge area to be provided, and, as far as practicable, give his judgment as to the kind of structure required. Only an approximation of this, of course, is possible on preliminary lines, as the class of structure usually depends upon the nature and depth of foundation, which can only be determined by borings and which are not to be undertaken on preliminary, except in cases of important structures.

It is desired to particularly impress upon the chief of party and levelman the extreme importance of determining, as the survey progresses, all high water marks and overflow limits. On the lines in hand, the most serious difficulty to be overcome is the proper and sufficient care of the wet season's rainfall.

He will enter in his note book an estimate of the acreage and a general description of each area, the drainage of which is to be carried through each waterway; laso any other matters of importance bearing upon the question of drainage discharge and foundations. He will also make particular and careful investigations regarding stone, sand, water and timber, their availability and fitness for use in constructing the masonry necessary for the bridges and culverts he proposes. These notes are to be full and explicit, and at the close of each distinctive survey are to be placed in the form of a report to accompany the returns on the survey.



SPECIMEN OF STANDARD PROFILE

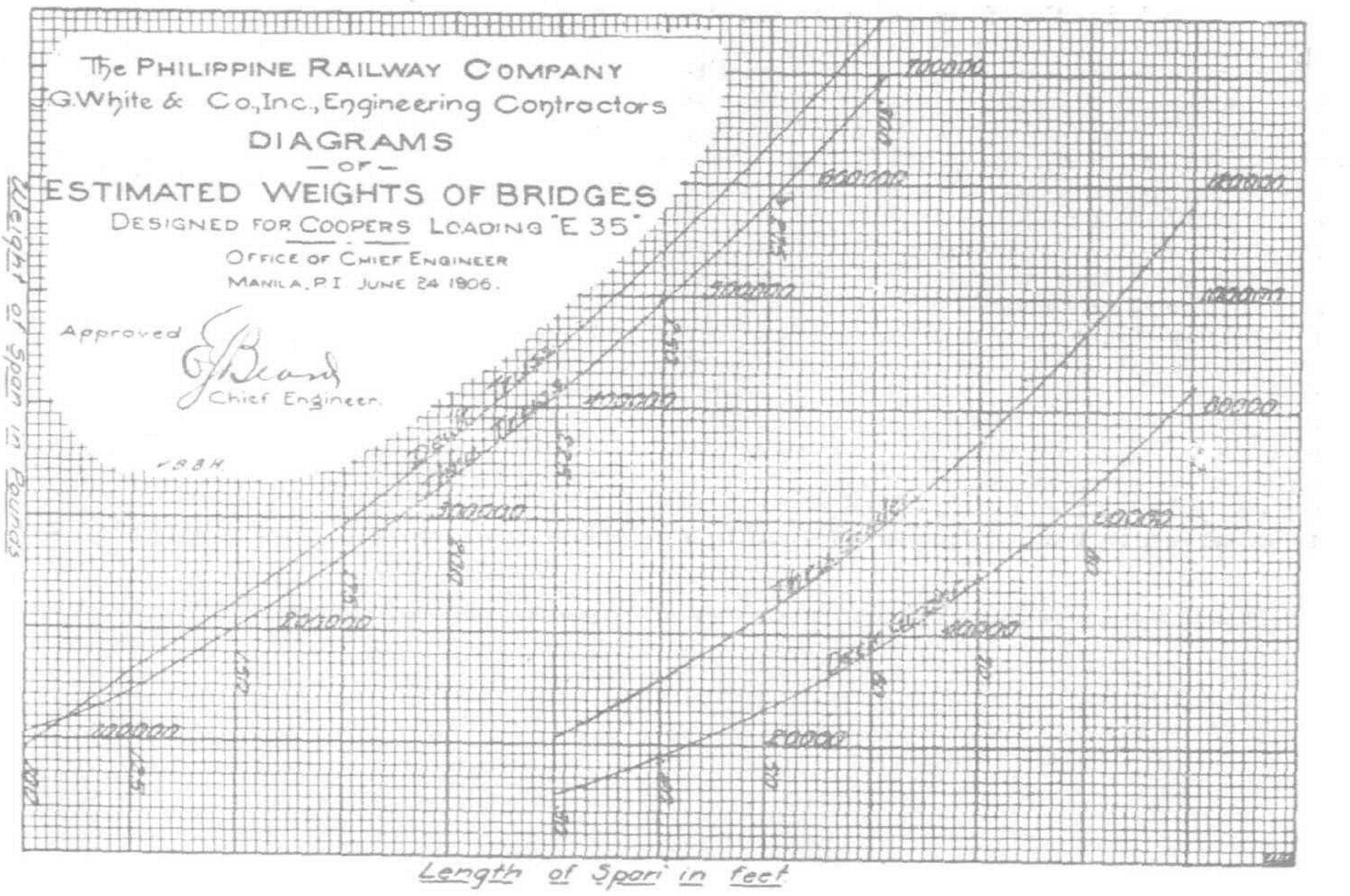
Sec. 7.—The draftsman, aided by the transitman, will plot all preliminary lines on the night of the day they are run, on 36″ duplex manila paper, to a scale of 400′ to the inch. The paper is to be of such length as will contain sufficient preliminary line to embrace 25 miles of continuous location. The following day the draftsman will check, ink in and station the line in *red*, and will plot all topography taken inking in each contour with India ink diluted to a consistency that will give a line of a lead pencil shade, except each 50′ contour which he will draw in with undiluted India ink, giving the elevation on each contour, as per sample of standard map attached. The trend of all streams is to be shown in blue, direction of their flow by an arrow; all other topographical features to be in undiluted black India ink. He will keep the line and topography at least 3″ *from the edges of this 36″ map roll*, and will not piece out the map on the sides by pasting on pieces of paper, it being preferred that the line be broken in order that all lines and topography be contained within the 30″ field. It is not intended that this relieve the draftsman and others concerned from making every effort to so start their line as to have it contained within this field with as few breaks as possible.

In plotting contours on the 400′ map, the drafstman should draw three faint pencil lines on each side parallel to and 100′ apart, by scale, from each preliminary tangent, and at right angles to them a line through each station producing 100′ squares corresponding to those used by the topographer, and by eye, instead of scale, transfer the topographer's sketches to his map. After inking in, the draftsman will erase the pencil lines.

All maps are to be made with the N. point in towards the top of the map and at such an angle as will keep the general direction of the line as near the centre of the roll as possible, breaking the line only when necessary to keep at least 3″ from the edge of the 36″ roll.

Sec. 8.—On the 400′ map the chief of party will project, in pencil, a projected location, scaling its alignment and station and mile throughout. The same regard is to be given to the projection alignment as if the line were being run in on the ground, and the rules later laid down as to alignment, etc. *(Sec. 21)*, are to be fully observed. No projection is to be inked in, but left in pencil, so that the final location can be inked in on this original topographical map and the same turned in as the final 400′ map of the located line.

Sec. 9.—Whenever possible, before beginning a survey, the chief of party will be furnished with a vicinity map of the country his line will traverse, on a scale approximating 1″ to the mile, showing the general characteristics of the country, for the uses hereafter named. If, however, the chief engineer's office lacks the data to either compile or furnish such a map the chief of party will have his draftsman, as soon as the party arrives in the field, prepare such a one on a scale of 5,000′ to the inch from the best data obtainable. This map is to cover the country between the termini of



the lines to be run and include a large area on each side. It is to show all the principal streams and other topographical features obtainable at the time, such as towns, villages, highways, mountain ranges, etc., and is to be gotten out as quickly as possible. As soon as it is made send a tracing thereof direct to the chief engineer, retaining the original. On the original, plot the projected location as fast as projected and fill in and correct the topography as developed by the survey, care being taken by the draftsman not to crowd the map with topography, as the object is to only show the general features and not small details, and to show the relative position of the line in regard to the country and its resources at large; however, show the degree of curve and every 5,000′ station and each fifth mile post. With each report of progress on survey, as called for hereafter, send in a small tracing of this or of that part of the line—and added topographical features run in since last report. This showing will be plotted on the full tracing heretefore sent in to the chief engineer's office, by his drafting forces. In any event, send in this small tracing with the report, even if delayed in sending in the full tracing of the whole map.

Sec. 10.—It is expected that all lines and levels run will be plotted the night of the day they are run, whether abandoned or not, and no notes of any line or backup are to be erased, but crossed out by two diagonal lines across the page; the projected location is also to be kept up to date.

Sec. 11.—Every effort should be made to carry forward one continuous preliminary stationing; also when projecting a location, follow side lines when necessary back to the main preliminary line. Unless otherwise instructed the main preliminary line will be stationed from zero. Side lines starting off of this main preliminary line will carry a continuation of its stationing. Each distinctive line is to have a prefixed letter marked on the stakes, profiles and maps, and recorded in the notes respectively, reserving the letters "L" and "S" for location use.

Sec. 12.—Transitmen and levelmen preliminary and final location will keep their notes in accordance with the standard indicated by sample leaves of each attached hereto. The rodman will carry a peg book, and it is a rule when checking turning points that neither levelman nor rodman call for the result until the levelman gives "ready," when the rodman will first call his result—to be noted by the levelman—and the levelman must under no circumstances say he is ready until he has obtained the elevation.

Instrumentmen, topographers and others will place no marks whatever on the outside of the note books they use. They will, upon beginning the use of each, title the fly leaf in the following forms:—

THE PHILIPPINE RAILWAY,
J. G. WHITE & Co., Inc., Engineering Contractors.
Preliminary Levels,
Iloilo to Passi—Panay Island.
Station 0 to 1000.
April, 1906.

J. J. HILL, Levelman.
P. H. JONES, Chief of Party "A."

At the same time number each leaf on the right hand page.

Each party will be designated by a letter as Party "A" or "B," etc., and the party's designating letter must appear on all titles, estimates, reports, etc.

WITHOUT FAIL, DATE THE BEGINNING AND ENDING OF EACH DAY'S WORK, making this entry when starting work in the morning and when quitting in the evening; note the condition of the weather under the morning entry and a general note of the day's weather under the evening entry.

EVERY TITLE MUST CONTAIN THE ISLAND'S NAME ON WHICH LINE IS SITUATED TO WHICH THE NOTES PERTAIN, AND NO NOTE BOOK CONTAINING NOTES OF LINES ON ONE ISLAND MUST BE USED FOR NOTES OF LINES ON OTHER ISLANDS.

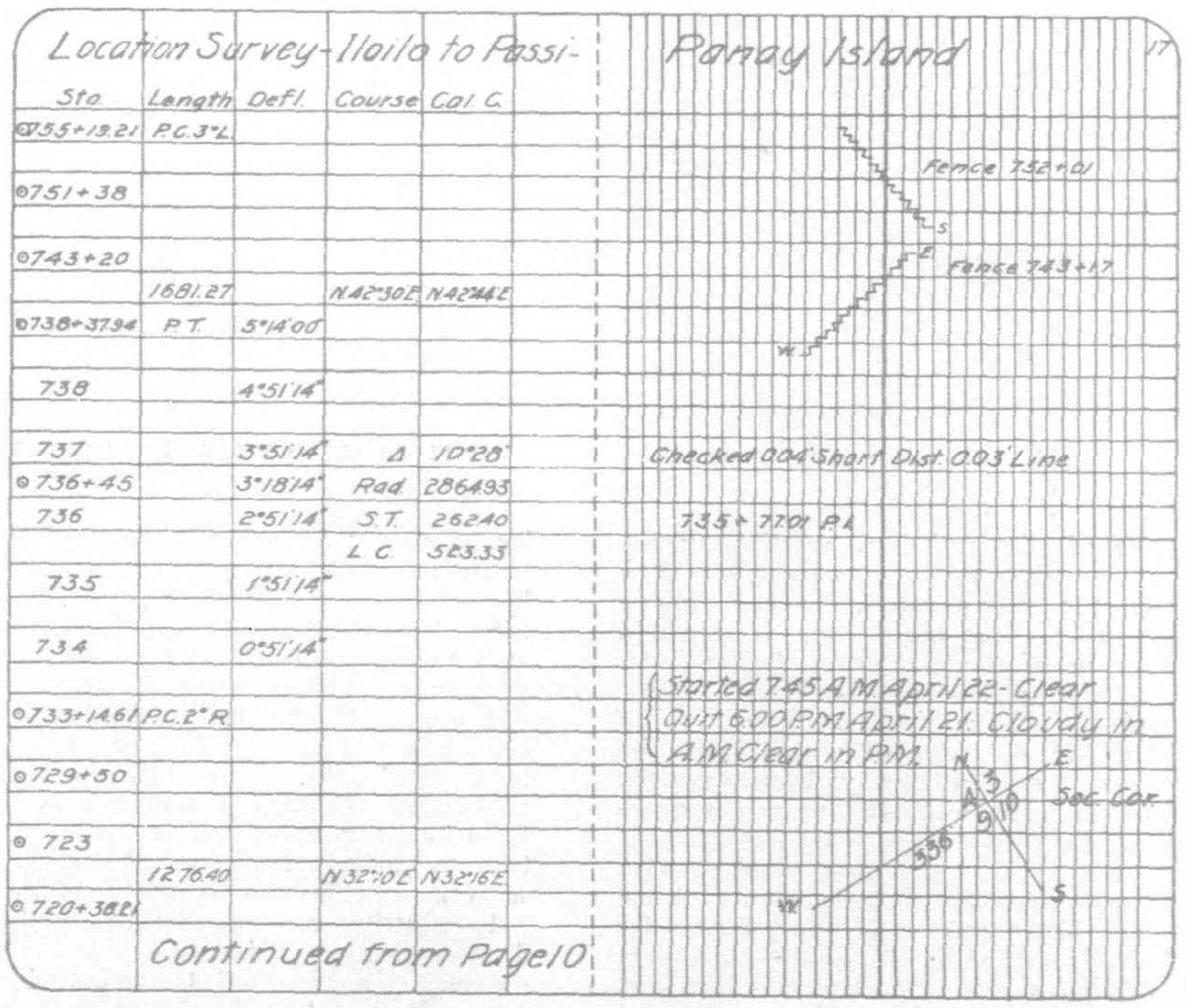
Next to the fly leaf, leave the first page blank for an index of contents. In this index enter station to station of all lines appearing in the book, entering the beginning station and its page at the time the line is started and the ending station and its page when reached or as far as the line is carried continuously in this book; all in such a manner that each station of each line can be immediately found by reference to the index.

In case of a line whose notes are interspersed through the book with notes of other lines, give the page and the book number of continuation of notes, and at the beginning of these notes refer back to the page from which they are carried forward.

Sec. 13.—The levelman will, at the beginning of all lines, refer to and describe the datum upon which his levels are used. The transitman will, by sketch on the right hand page of transit book, particularly describe the starting point of his line. Both these men and the topographer are to carefully enter all equations in case of broken stationing, and at the beginning and ending of each line, the proper equality.

Sec. 14.—Where no datum has been established by the United States Coast Survey, or other government bureaus, a bench will be established and its elevation as carefully determined in relation to mean low tide as time will permit.

Great care must be taken to establish a sufficient number of bench marks of such lasting character as to insure their existence until the completion of construction. On preliminary lines permanent bench marks are to be established every mile, and on final location every half mile will be sufficient,

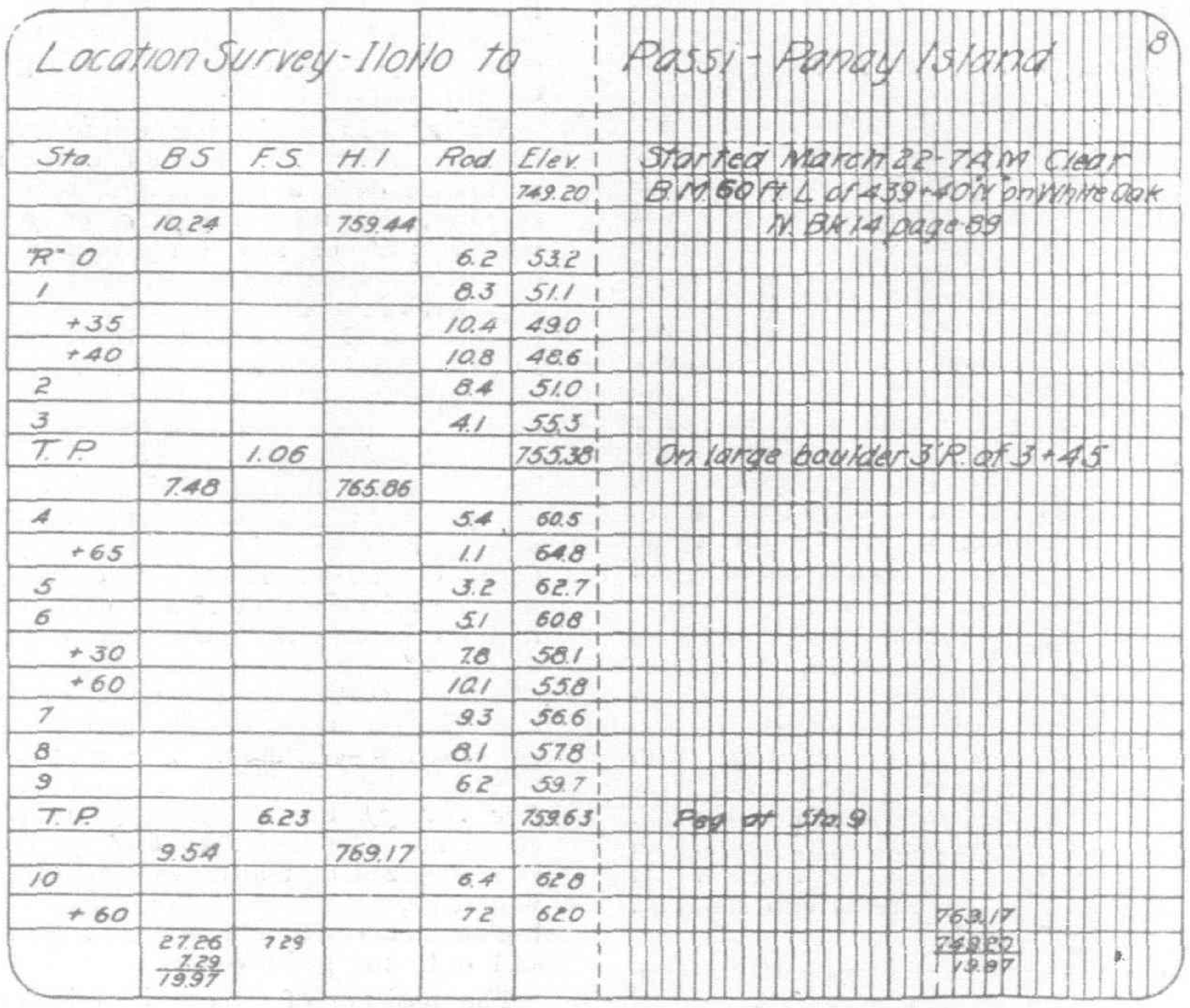

Location Survey—Iloilo to Passi—Panay Island 17

Sta.	Length	Defl.	Course	Cal. C.
⊙755+19.21	P.C. 3° L			
⊙751+38				
⊙743+20				
	1681.27		N42°30′E	N42°44′E
⊙738+37.94	P.T.	5°14′00″		
738		4°51′14″		
737		3°51′14″	Δ	10°28′
⊙736+45		3°18′14″	Rad	2864.93
736		2°51′14″	S.T.	262.40
			L.C.	523.33
735		1°51′14″		
734		0°51′14″		
⊙733+14.61	P.C. 2° R			
⊙729+50				
⊙723				
	1276.40		N32°10′E	N32°16′E
⊙720+38.21				

Continued from Page 10

Fence 752+01
Fence 743+17
Checked 0.04′ Short Dist. 0.03′ Line
735+77.01 P.I.
Started 7.45 A.M. April 22—Clear
Quit 6.00 P.M. April 21. Cloudy in A.M. Clear in P.M.

SPECIMEN PAGE LOCATION TRANSIT NOTES



Location Survey-IloIlo to Passi-Panay Island 8

Sta.	B.S.	F.S.	H.I.	Rod	Elev.	
						Started March 22-7 A.M. Clear
					749.20	B.M. 60 ft L of 439+40 N on White Oak
	10.24		759.44			N. Bk 14 page 89
"R" 0				6.2	53.2	
1				8.3	51.1	
+35				10.4	49.0	
+40				10.8	48.6	
2				8.4	51.0	
3				4.1	55.3	
T.P.		1.06			755.38	On large boulder 3' R. of 3+45
	7.48		765.86			
4				5.4	60.5	
+65				1.1	64.8	
5				3.2	62.7	
6				5.1	60.8	
+30				7.8	58.1	
+60				10.1	55.8	
7				9.3	56.6	
8				8.1	57.8	
9				6.2	59.7	
T.P.		6.23			759.63	Peg at Sta. 9
	9.54		769.17			
10				6.4	62.8	
+60				7.2	62.0	769.17
	27.26 7.29 19.97	7.29				749.20 19.97

SPECIMEN PAGE LEVEL NOTES

but oftener if enough permanent objects can be readily reached. It must be borne in mind that wooden stakes are subject to displacement by the natives or destruction by white ants and from other causes to rapid decay; therefore, every effort should be made to establish them of stone or metal. The same is true as to line stakes placed by transit parties and frequent ties to permanent objects should be made to insure the ready re-establishment of the line if destroyed by any of the agencies mentioned.

Section 15.—The ground and grade line of all preliminary profiles will be left in pencil, each day's work must be plotted continuously on a roll holding 25 ms. each, side line profile following main line profiles on the same profile roll in the order in which ties are run; this necessarily breaks the main line profile, but brings all profiles in the neighborhood of all other lines covering the same country, which is what is desired.

NO PROFILE GROUND LINES ARE TO BE PLOTTED OVER EACH OTHER.

Each line is to have marked on it by the levelman, at time of plotting, its designating letter, to be large and neat, and placed at frequent intervals. The levelman must be particular to note all high-water marks obtained; mark on every 50' horizontal its elevation; also enter on the profile all data taken during the day.

Section 16—ALL PROFILES ARE TO BE PLOTTED IN THE SAME DIRECTION AS THE LINE IS PLOTTED ON THE MAP.

Section 17—The draftsman will title the profile, on the outside edge of each 25-m. roll *at both ends*, showing each line and the station to station thereof contained in each roll, in form outlined in *Sec. 12*. The same applies to all manila maps. Observe the important instructions contained in *Sec. 12* about all titles containing the name of island. The main title on face of map or profile will be placed on in the chief engineer's office. At least 18" of blank paper is to be left at each end of profile and map rolls to allow for a title and wrapper.

Sec. 18.—As fast as the projected location is worked up, the chief of party will, from the contours, have taken off and plotted with care, a profile on which he will lay a grade and show all openings and the alignment. He will show thereon each mile post 5,280' apart, and unless otherwise instructed, show mileage from zero.

Sec. 19.—From the projected profile make a careful estimate of all quantities up to the base of tie. Include all ditches, sub-grading and back-filling, but do not plot the overhaul nor distribution of graduation quantities. Include station grounds, yards, etc. Estimate the overhaul approximately from inspection. The quantities in embankment should be considered and entered separately between bridge ends and the mouth of cuts. Obtain all structural quantities from blue prints of standard structures, to be obtained from the chief engineer. These standards must be followed throughout and no special structures estimated on without instructions. In estimating graduation quantities, transverse slopes taken from topographical notes, must be taken into consideration, to the end that quantities are sufficient to cover the work to be performed. Classification must be carefully considered and great care taken that it is amply provided for. The data therefor is to be secured in the manner outlined in *Sec. 24*, and all classification quantities as estimated marked on each excavation. Show a summary of each mile as indicated on the standard profile attached. Transfer this summary on to a standard construction estimate sheet, *Form No. 21*, using one line for each mile. Make a duplicate copy of each estimate sheet for each 25 m. and forward to the chief engineer's office, together with a summary thereof on *Form No. 22*.

Sec. 20.—Prepare and forward with each 25-m. estimate sent to the chief engineer, a statement giving the following information:—

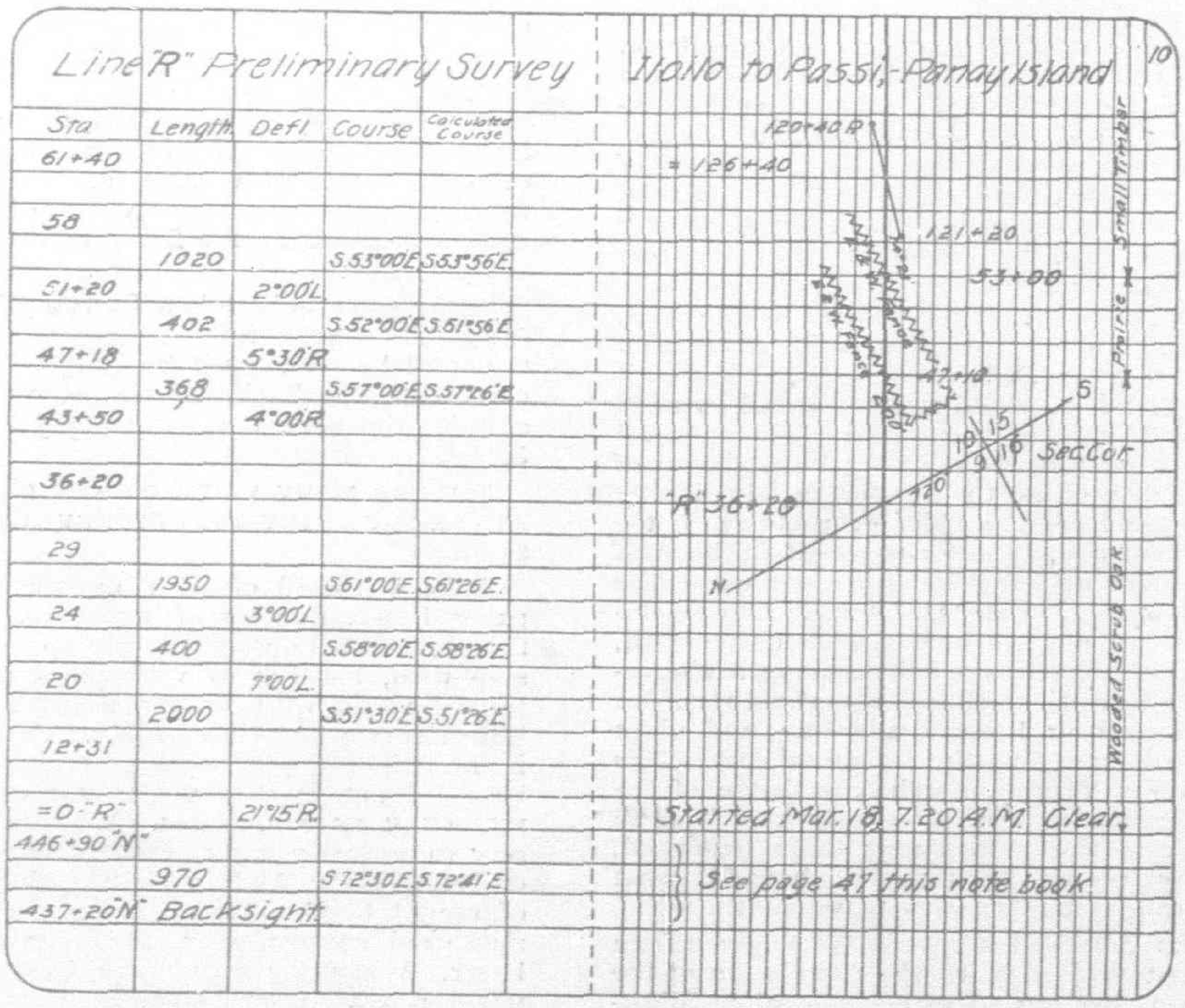
Total length of line, miles, ...
Total degree of curvature, ...
Total length of tangent, feet...., miles, ...
Total length of curvature, ,,...., ,, ...
Percent curvature, ...
Percent tangent, ...
Maximum curve, ...
Maximum grade, ...
Total rise and fall, north-bound, feet, ...
do south- ,, ,, ...
do of each rate of grade used north-bound, ...
do of each rate of grade used south-bound, ...
Total lineal length of bridging, feet, ...
This bridging to include only open deck.

Sec. 21.—A statement is attached giving the weights of the company's standard steel bridges. These weights will be used in making up the estimate. Similarly, statements are attached giving quantities in standard culverts, abutments, piers and other masonry structures.

Sec. 22.—On final location, the chief of party will be expected to better the projection in detail, as far as possible, but no great deviation from the approved projection is to be made without authority covering each case; at the same time, each chief of party will be held responsible for not suggesting improvements that could be made in connection with which he has not protected himself by calling his superior's attention thereto in writing.

Upon location it will frequently be found advisable to run further preliminary lines in an effort to obtain better results. These will be termed "spur" lines and are designated by the letter "S" and consecutively as S-1, S-2, etc. They will be plotted on a preliminary profile separate from the location profiles, which latter is to be continuous, indexed, etc., exactly as defined for preliminary lines.

On location, ink in the located line on the 400' contour map and obtain such data as is



Line "R" Preliminary Survey IloIlo to Passi, Panay Island 10

Sta	Length	Defl	Course	Calculated Course	
61+40					
58					
	1020		S.53°00'E.	S.53°56'E.	
51+20		2°00'L			
	402		S.52°00'E.	S.51°56'E.	
47+18		5°30'R			
	368		S.57°00'E.	S.57°26'E.	
43+50		4°00'R			
36+20					
29					
	1950		S.61°00'E.	S.61°26'E.	
24		3°00'L			
	400		S.58°00'E.	S.58°26'E.	
20		7°00'L.			
	2000		S.51°30'E.	S.51°26'E.	
12+31					
=0 "R"		21°15'R.			Started Mar. 18, 7.20 A.M. Clear.
446+90 "N"					
	970		S.72°30'E.	S.72°41'E.	See page 47 this note book
437+20 "N"	Backsight				

SPECIMEN PAGE PRELIMINARY TRANSIT NOTES

necessary to complete this map in every particular as to property ties, boundary, etc. Show the alignment; *p. c.'s; p. t.'s;* degree and angles of curves; stationing and mile-posts; the stationing and plus at each property tie, and all angles thereto obtainable. Show the right-of-way required to construct the road allowing sufficient for borrow pits and waste banks; all property owners whose lands are crossed and the acreage required from each. The terminal of the line is to be fixed by course and distance to the nearest existing corner of the public survey where obtainable. On each map place the N. point showing the true and magnetic bearing, noting the variation obtained in the field and placing the true course only on long tangents so as not to crowd the work. From this map make a tracing in 25-m. sections, omitting the contours, showing all else on this tracing.

Sec. 23.—A blue print of the standard sizes and titles of drawings is attached, and is to be followed by the draftsman in the field, excepting where otherwise specified in these instructions, and in all cases is to contain the date of completion of map, name of the chief of party and of the draftsman executing the drawing. Draftsmen will always make their tracings on the dull side of the cloth and bear in mind that their tracings must be one of two standard widths, either 36″ or 18″.

Sec. 24.—On location, chainmen will be supplied with plumb bobs, which are to be used on all location chaining to the end that all measurements will be correct, a final measurement to be taken after the station stake is driven. This is not necessary on preliminary lines.

Sec. 25.—On location, determine approximately all drainage areas discharging to minor openings and plot their boundaries upon the 400′ map. At bridges and large openings, and when practicable in case of minor openings, cross-section areas are to be obtained by determining the high water mark where the line crosses, also at a point considerably above the opening, and at another considerably below the opening, and at those three places take the cross-section discharge area of the stream; also obtain, as far as possible, the fall of the stream, selecting for the measurement, whenever possible, places where the stream at high water would be entirely in flow. Plot all discharge area sections on cross-section paper in accordance with the ravine section attached, giving all the data called for therein and by the foregoing.

On location, chiefs of party, unless otherwise instructed will organize a sounding party properly equipped with drill and sounding apparatus in charge of a man accustomed to construction work and classification. This party will sound all cuts, from which sounding the chiefs of party will determine the classification in excavation; location of all holes and notes thereof are to be plotted on the profile. In case the apparatus furnished is insufficient to give satisfactory results, test pits will be sunk sufficient in number as, in the opinion of the chief of party, are necessary to enable him to determine closely the character of excavation that will be encountered. He will sound all bridge openings to determine, for construction purposes, the depth and character of foundations. He will plot the results of all soundings on the ravine sections and profiles. It is expected that at all openings requiring deep masonry foundations, arrangements will be made for a pipe and bit drilling outfit in charge of a separate party, such work usually requiring a more extensive equipment than that carried by the regular sounding party. The chief of party will personally give close attention to the work of the sounding party under his direction, to the end that a reasonably accurate determination will be arrived at as to the amount of classification and the nature of soundings.

Sec. 26.—On location, additional and fuller notes and ties beyond those on preliminary must be obtained in towns or cities, full notes of street connections, etc., copies of plats thereof when obtainable must be taken so as to enable the draftsman to put the correct layout of each town, village or city on the map.

Sec. 27.—In projecting alignment and in running in the location no curve must be permitted over a bridge, but may be over culverts, nor must any *p. c.* or *p. t.* come within 300′ of any bridge. This positive instruction must not be avoided without the approval of the chief engineer, then the curve must be so located as to bring the bridge as near its middle as possible. At least 1,000′ of tangent must be provided between reverse curves, and two curves in the same direction within 2,000′ of each other are to be considered bad practice. It is preferred that curves be always of an even degree index, and with a little care it is seldom necessary to have them otherwise. Easement curves will be used on all curves of 2° and over, but unless it develops that the maximum curvature will exceed 4°, no notice will be taken of these easement curves by the chief of party, as the offsets can be readily cared for by the construction engineer. The maximum curvature desired by this company is ....degrees *(see Sec. 3)*, the minimum 30 min. and no curve must be less than 600′ in length. It is recognized that at times severe topography will require an increase over this maximum, but such curves should be used with hesitancy and only for good cause.

The position of curves in relation to the grade line has a marked effect on the economy of operation, by their limiting effect on speed at points where the gradients will economically allow high speed. The sharper curves are least objectionable near high summits, next on long level or minor gradients, and the most objectionable on the lower reaches of steep gradients. The expense arising from their position is an additional and separate one from that arising from the wear and tear due to curves. The maximum gradients will, in all cases, be compensated over curves at the rate of—

00.3 per degree for all curves over 8 deg.
00.4 do 3 ,, and less than 8,
00.5 do less than 3 deg.

Sec. 28.—In projecting and locating the line, the resulting grade planes must be carefully considered. The maximum grade can only be determined upon after the completion of the preliminaries, and when decided upon, is only to be used where necessary and in as short planes as possible. In laying minor gradients it is not desired that long continuous planes be secured at an additional expense for construction. Broken grade lines with sags whose vertical depth is equivalent to, or less than, the velocity head resulting from ordinary freight train speed, is not objectionable; but all gradients and sags must be connected with vertical curves having a rate of change of not less than 0.05 per station. Vertical curves over summits will be uniformly 400′ in length, regardless of what the rate of change may be.

Chiefs of party, for the purpose of estimates, will lay a grade line on their projected location and also on final location profiles, but each is to be left in pencil and not inked in until approved by the chief engineer. This approval will generally occur after the transmisison of the final profiles to this office. In laying the grade line, the chief of party will try more than one, in order to ascertain the most economical by calculating the pay quantities to one or more grade lines, taking into consideration all matters in connection therewith, such as classification and the changes in character and dimensions of drainage structures, due to a higher or lower grade line, and adopt one that will give the least total cost. This involves a very thorough knowledge of the classification that will be encountered, as in hard cuts the grades may often be raised, thereby increasing the fill beyond what appearances might seem to warrant.

Much care and study should be given from the first projection to the completion of the location, looking to as economical an adjustment of the grades and lines at stations as possible. They should be located on tangents that extend at least 2,000′ each way from the headblocks of the passing track, which it is expected on this work will not exceed 1,500′ in length. When the location of a station on a curve cannot be avoided, locate the buildings and sidings on the outside of it, so as to give the train engineers as good a view as possible. Through station grounds, grades should be laid as close to the ground as permissible, and provision made for obtaining the material without creating objectionable borrow pits on the station grounds. This can often be accomplished by adopting a semi-circular cross-section the entire width of the station grounds, much as a highway is graded up. The grade through station grounds and for a train length beyond each passing track headblock should be, at least, 0.4 less than the ruling grade, and it is preferable that station grades summit near the depot. In addition to this, it will result in economical operation to keep the grade as much below the maximum as possible for as long a distance as possible each way from all stations, in order that trains may get under way as rapidly as possible.

Sec. 29.—It is this company's rule that the rates of grade shall be in even tenths, except on long supported grades where compensation for curvature necessitates taking advantage of every foot and carrying the rates and grade elevations to hundreths.

Sec. 30.—Every Sunday draw up and mail to the chief engineer a brief letter report giving progress made during the last week, accompanying this weekly report with a pencil tracing profile, whenever possible, of the projection or location, as the case may be, together, in all cases, with a tracing of the 5,000′ map showing the line run since last report, as given in *Sec. 9.*

Sec. 31.—Address all mail to the Chief Engineer of the Philippine Railway Company, Manila, P. I.

TAKING PHOTOGRAPHS

Sec. 32.—Each party will be furnished with a No. 3-A Eastman kodak, tripod and carrying case. Six rolls of films, of ten exposures, will accompany same. Additional films will be furnished from time to time, as requested.

A book of instructions accompanies each kodak, and the instructions relative to the loading, focusing, making exposures, time of exposures, use of stops, etc., should be carefully followed.

Time exposures are more desirable than snap-shots, allowing a smaller stop or diaphram opening to be used, thereby increasing the sharpness of the picture.

Pictures taken should show the principal topographical features, points of interest, rivers crossed, scenes in villages and towns along the line of survey, and views of locating parties at work in the field, moving and in camp.

Pictures are to be taken for two purposes:—*(1st)*. To convey information as to country traversed by line. *(2d)* To supply the Press, especially the Technical Press, with views showing the work being done by J. G. White & Co.

TAKE AS MANY VIEWS OF ANY ONE SCENE AS ARE NECESSARY TO PROPERLY ILLUSTRATE SAME.

Make a record of each exposure, giving party letter, number of exposure, name of island, date, title, weather, length of exposure, stop used, location of view point and object photographed with reference to stations on line of survey and time of day. Form No. 23 is furnished for this purpose, which must be filled out AT THE TIME OF MAKING THE EXPOSURE IN ALL CASES. Whenever necessary to properly describe point of view and object photographed, make sketch on back of record blank. Each exposure should be numbered consecutively, prefixing the party letter. When the entire roll has been exposed remove from kodak, seal, and note, on the gum paper used to seal it, the number of exposures contained in the roll, for example: the first roll exposed by Party "A" will be marked Exposures A-1 to A-10 inclusive. Inclose record slips, retaining carbon copy, with roll of films, and mail to the chief engineer's office to be developed. Note on the outside of the package that same contains films. If, upon developing, it is found that negatives have been under or over exposed, or wrong stops used, the chief engineer's office will so advise.

ACCOUNTING—TIME AND PAY ROLLS.

Sec. 33.—(1-A) Each chief of party will be furnished with a time book, *Form No. 10*, in which he will keep and distribute the time of each employee in accordance with *Sec. No*......; this book to be retained as the chief of party's record of all labor performed under his direction. *(1-B)* At the end of each month the chief of party will make up from his time book a time roll, *Form No. 11*, giving the name of each employee, rate, total amount, deduction and net amount due. If an employee works by the day, his rate is to be given by the day; if by the month, the days worked will be the numerator and the days in the month will be the denominator of a fraction which, when multiplied by the monthly rate, gives the amount earned by the employee. No change in any salary or rate of wages is to be made without the approval of the chief engineer. *(1-C)* Each white member of the party and such Filipino employees as assent thereto, will be paid monthly and carried on monthly time roll, *Form No. 11*. It is expected, however, that it will be necessary to pay most of the native labor oftener, and for them a weekly memo pay roll will be prepared on *Form No. 11*, Time Roll, in the office of the chief of party. Payments to them will be made whenever, in the judgment of the chief of party, it is necessary by cashing a SERVICE VOUCHER, *Form No. 14*, a supply of which must be kept on hand, and no labor payment is to be made without at the time issuing such a voucher. In the same way pay men discharged or leaving the service. Service vouchers issued and paid by chief of party will be attached to his monthly expense account and entered thereon as cash expended. In all cases, show service voucher numbers, and the name of every party receiving a service voucher must appear on the time roll. The chief of party, when returning time rolls, covering monthly men, will accompany the same with a summary time roll covering the weekly time rolls, *Form No. 11*, which summary is to have attached all the time rolls covering daily men. No monthly employee's name must appear on more than one time roll during working period. *(1-D)* In case it is desired to transfer an employee from one party to another, or from one division to another, the chief of party making the transfer will issue a transfer letter to the chief of party or other superior officer to whom the employee is to report, stating reason of transfer, time and amount due employee, and distribution. The chief of party to whom employee reports will carry his time for the entire working period during the month, also such additional time allowed for actual traveling time required to reach his objective point, showing in his monthly distribution proper amount chargeable to division or party from which employee is transferred.

Sec. 34.—Distribute the amount of time roll to the proper sub accounts of "Engineering, Account No. [illegible]," in space provided on face of time roll, *Form No. 11*, as directed in *Sec. 39*.

EXPENSE ACCOUNTS.

Sec. 35.-A—Sufficient funds will be advanced to chiefs of party to cover estimated authorized necessary monthly expenditures, and also labor paid on service vouchers. *(35-B.)*. Receipts for all expenditures other than labor will be taken in triplicate on *Form No. 20*. *(35 C.)*. At the end of each month the chief of party will make up, using writing fluid, an expense account in triplicate on *Form No. 13*, including thereon every expenditure for which he seeks reimbursement and attach thereto all receipts and service vouchers prescribed by *Sec. 33-1-C*, and *Sec. 35-B*. After each entry give receipt or service voucher number, placing as many items on each line as convenient, and observe the instructions on back of *Form No. 13*. *(35-D.)*. Receipt the expense account, *Form No. 13*, as paid, in which condition it stands as an offset by its amount against the funds advanced under *A* of *Sec. 35* and until, in order to keep you in funds, a pay voucher for the amount thereof approved by the chief engineer is sent you, In this way chiefs of party will be kept in funds to meet their current expenses.

Sec. 36.—When making your monthly expense account, prepare a monthly cash balance sheet, *Form No. 15*, giving balance at 1st of each month, cash by voucher or otherwise received of the company during current month, and balance on hand at date. If any differences are found by the account departments, immediate notice will be given you in writing, otherwise, if found correct, no notice will be given.

Sec. 37.—Each chief of party will keep on hand the necessary forms and blanks, to enable him to comply with these instructions, to be procured by requisition on *Form No. 16*, addressed to the chief engineer at Manila. This, and all requisitions for stationery, subsistence supplies, etc., must be made in the first day of each current month, and in amount sufficient to meet all requirements of the following month, it being understood that ONLY ONE requisition each of *Forms 16* and *17* should be made each month.

Sec. 38.—Expense accounts and pay rolls will be distributed on *Form No. 18*, Cost of Surveys, and pay rolls and expense accounts on *Form No. 19*, in accordance with the sub accounts of Engineering Account No. 1.—*Sec. 39*.

Sec. 39.—Sub-Accounts: Railroad Transportation, *(1-A)*. This account to include all fares to and from field, living and incidental expenses while in transit that are necessary to put the party to or from the field. Hotel and Commissary, *(1-B)*. This account to include board and lodging of party or all subsistence supplies purchased and furnished to party while in the field, the transport cost and wages of cooks and attendance connected with providing and preparing subsistence. Tools and instruments, *(1-C)*. This account to include the cost and repairs of all tools and engineering instruments used in conducting surveys. Camp Outfit, *(1-D)*. This account to include all tents, houses, cots, cooking utensils and items of like nature necessary to provide quarters and plant for cooking. Livery and Transportation on Work, *(1-E)*. This account to include all expenditures for transportation of party or individual members while engaged in conducting surveys and after reaching the field, such as cost and subsistence of pack animals and their attendants, boat fares and boat hire and all expenses connected therewith not included in *1-B* of *Sec. 39*. Survey Wages, *(1-F)*. This account to include the salary or wages paid to engineers and their assistants actually engaged in conducting surveys in the field or handling office work connected with such surveys not included in accounts heretofore specified.

Sec. 40.—From the foregoing, *Sec. 33* to *Sec. 39* inclusive, the chief of party will fill out on the 1st of each month and on that day forward to the chief engineer the following:—

Form No.
11 — Time roll
13 — Expense account
15 — Cash balance statement
16 — Stationery requisition
17 — Material
18 — Coast of survey"
19 — Distribution
21 — Estimate

Forward all inclosures under one cover by prescribed route and means of transportation as may be designated.

JAPANESE PIECEGOODS IN MANCHURIA

SCHEME TO DEVELOP THE TRADE

The *Tokyo Asahi* states that five cotton textile companies in the Kansai district, viz, Osaka Boseki, Miye Boseki, Kanakin Sheishoku, Temma Orimono, and Okayama Boseki, have formed a guild for the exportation of cotton goods to Manchuria. The guild is to entrust Mitsui & Co. with the sole business of selling their goods. The above mentioned factories will manufacture cotton goods equal to the standard quality, and label them with the same trade mark. They will export at least 12,000 bales (valued at 1,200,000 *yen*) every year, and keep up the exports, even though they incur some loss in the business. The Mitsui Co. has decided to do its best to push on the sale, and the service will be rendered free of charge for the time being. In order to successfully promote their enterprise in the face of inevitable competition, the parties concerned have approached the Ministers of Finance and of Communications with the following requests:—

(1.) The Government to guarantee a maximum loan of 6,000,000 *yen* at the rate of interest of 4 per cent. per annum, to be advanced on documentary drafts, payable in 4 months. The loan to be advanced in gold in Japan and repaid in silver at the place of payment of the drafts, according to exchange quotations on the date of payment of the drafts.

(2.) Goods mentioned in the drafts to be delivered under certain limitations, even before they are paid or when a security has been furnished, according to circumstances.

(3.) The Chinese Eastern Railway to carry the exports free of charge or at half rates for one year hence.

(4.) The marine freightage also to be reduced to one-half for one year hence.

In this connection, the Government has decided to make the loan through the Yokohama Specie Bank, without limitations as to the amount, not only on cotton textiles but on matches, cement, beer, marine products, timber, cotton yarns, and other goods to be exported to Manchuria, at the rate of 4½ per cent. per annum. In case a single concern or company has effected an export of more than 5,000,000 *yen* a year, the Government will refund ½ per cent. of the interest mentioned above. As regards freightage, the Government will carry out negotiations with the War Office in connection with the Chinese Eastern Railway, and also with the N. Y. K. and Osaka Shosen Kaisha.

The Government will pursue a similar policy with regard to Korea, where the Dai-ichi Ginko (First Bank) is to act as the Specie Bank acts in Manchuria.

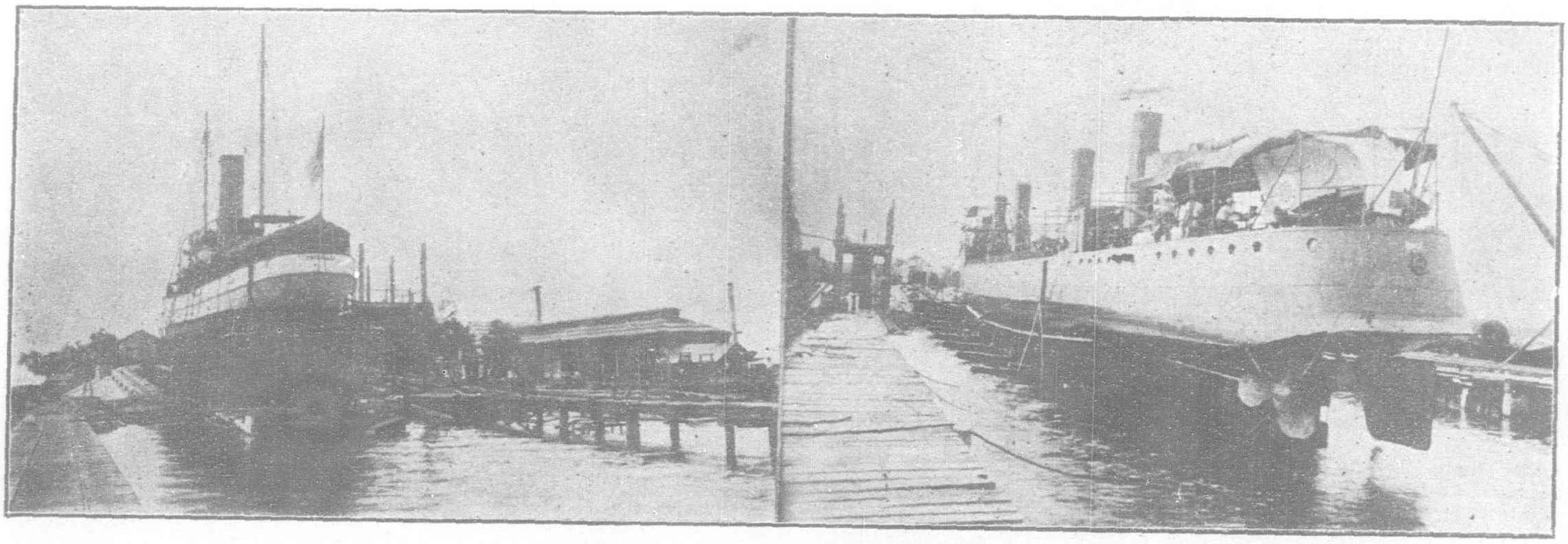
THE CHENGTING-KAIFONG RAILWAY:—The branch line of the Chinghan railway connecting Chengting with Kaifong has been so far completed that construction trains were given to run through the entire line on the 4th inst.

It is reported that the line will be formally opened to public traffic on June 21st.

KOWLOON-CANTON RAILWAY:—It is reported in Canton that the agreement re the Kowloon-Canton Railway has been satisfactorily arranged between the Viceroy of Canton and His Excellency Sir Mathew Nathan. The trouble was in connection with the Chinese section of the line.

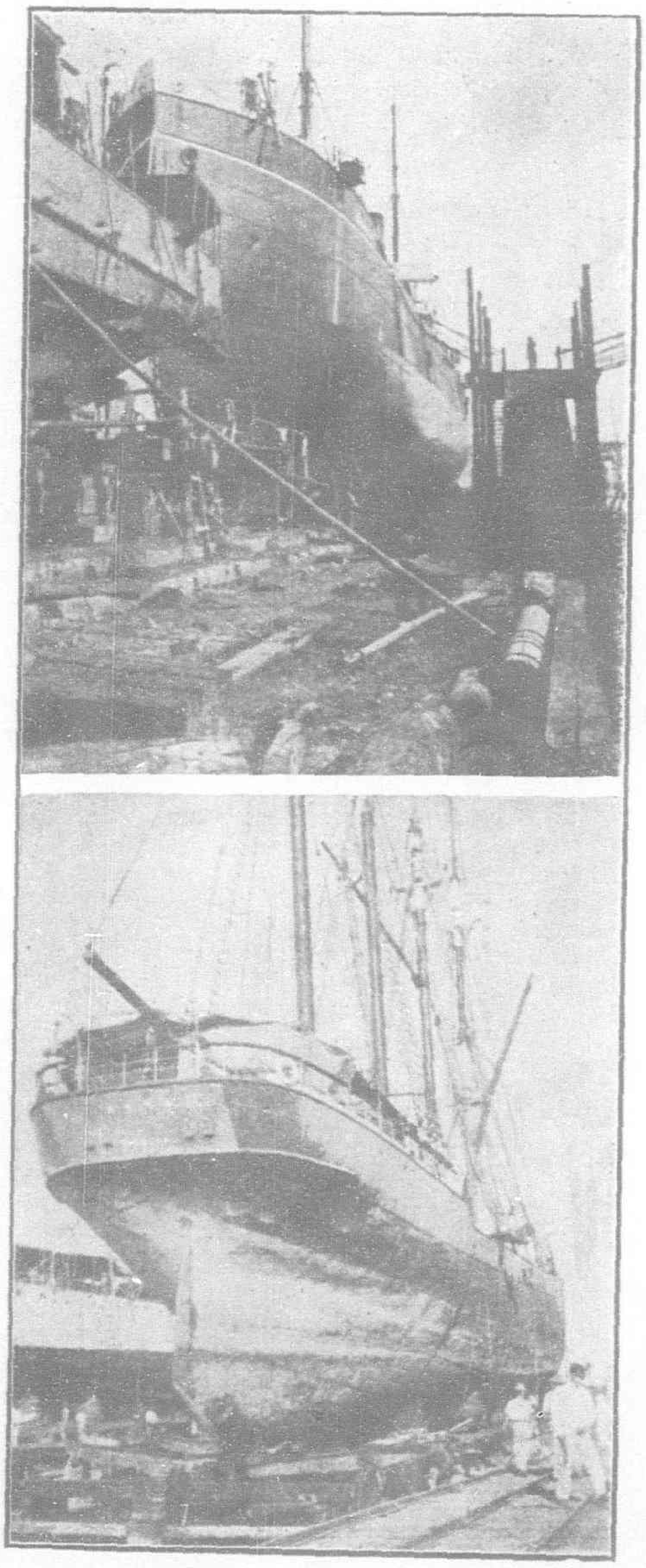
CHINESE EASTERN RAILWAY:—According to a Peking despatch, the freight rates on the Russian section of the Chinese Eastern Railway have twice been increased. The reason alleged is that Russia desires to divert to Vladivostock the goods traffic of North China ports.

It is said that the F. M. S. Railway will be extended to Kuala Muda, P. W., and that Butterworth will be made the principal passenger station, whilst Prai will be converted into a goods and coaling station.



U. S. S. "PISCATAQUA" AND TORPEDO BOAT "DALE" ON SLIPS

THE "VARADERO" SLIPWAYS AT CANACAO



FOUR MASTED SCHOONER "ALTA" AND S. S. "MINAS DE BATAAN" UNDERGOING REPAIRS AT CANACAO

The oldest established shipyard in the Philippines, located at Cavite, is known as the "Varadero de Manila" or the Manila Slip Co. Here in the sheltered bay of Cañacao vessels can anchor and repair work carried on in any weather. The works have been built up by native capital and brains under the management of Mr. Rafael Reyes, a type of the high class Filipino capitalists who have faith in the development of their islands.

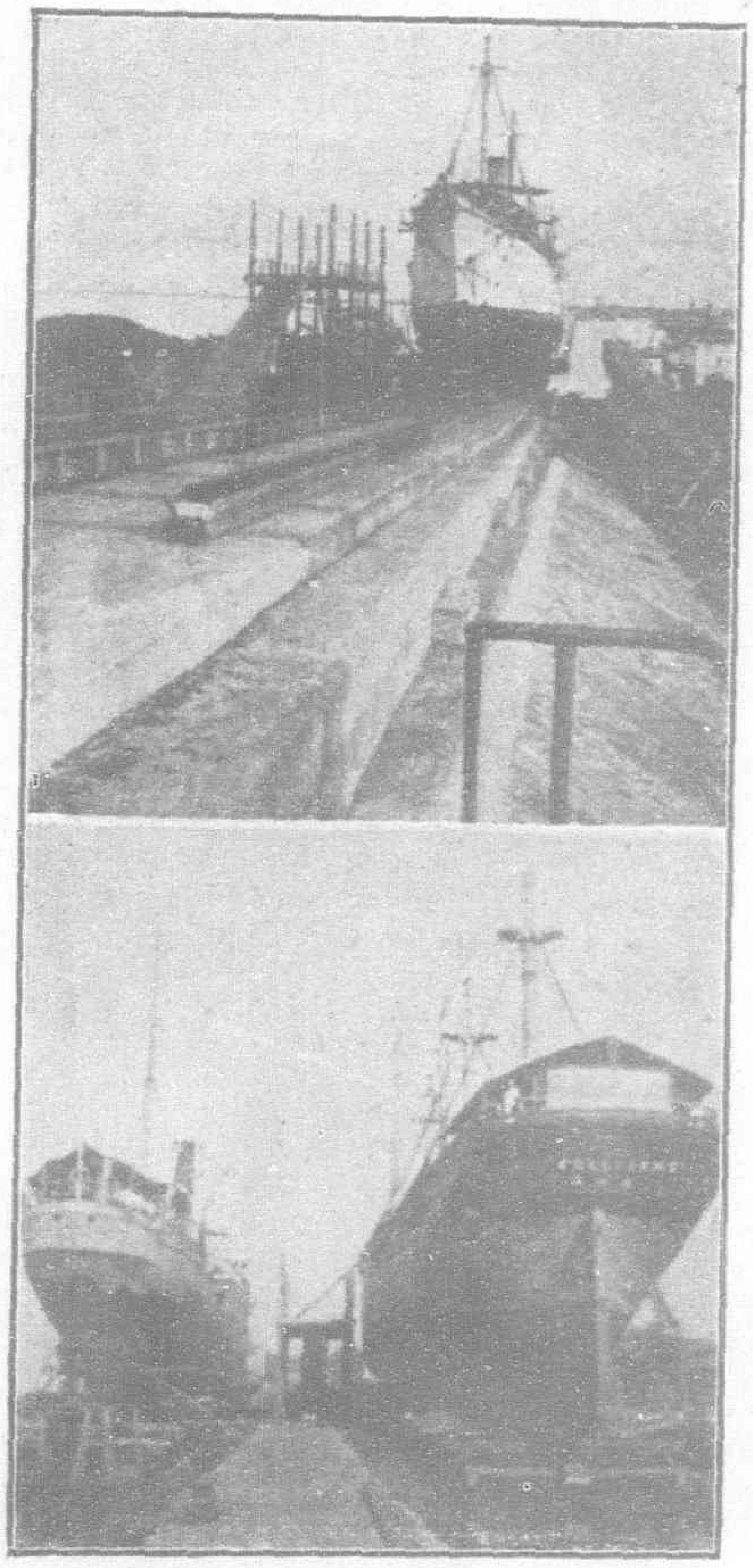
From a small beginning the enterprise has increased, despite many drawbacks and unjust competition, to its present capacity. Two marine railways have been built, one capable of docking a vessel of 2000 tons, gross register, and the other up to 1000 tons. An extensive plant, with machinery and tools for handling this class of work, has been developed, consisting of plating and boiler shops, where any type of boiler can be made and repaired, smithy, foundry, fitting, carpenter and coppersmith shops and a large machine tool equipment with all the requisite appliances for carrying on the necessary repairs to hulls, boilers and engines. A large capital is constantly tied up in keeping up the necessary stock of materials for the proper prosecution of repairs and building.

For a long time these docks were the only available ones for the smaller vessels of the navy and the coast guard service, and if the proper encouragement had been extended to them, there would have been no necessity for the erection of the government slipway at Engineer's Island, which diverts a large share of patronage from the struggling engineer firms of Manila.

The "Varadero" has proven its ability to handle its share of the government work, within its limitations, and the following war vessels have been successfully docked and repaired since the American occupation of the Islands: The United States ships "Wilmington," "Helena," "Petrel," "Castine," "Marietta," "Princeton," "Vicksburg," "Annapolis," and the captured gunboats "Isla de Cuba," "Isla de Luzon," "Don Juan de Austria," "Villalobos," "Elcano," "Quiros," "Pampanga," "Paragua," "Samar," "Callao" and "Arayat," also the large seagoing tugboats "Piscataqua" and "Wampatuck." The transports "Pompey," "General Alava" and "Manila" have also been docked and repaired.

In the earlier days, under the patronage of the Spanish Government, and before being placed in competition with the cheap labor of the China coast, considerable shipbuilding was successfully undertaken by this local concern. The gunboats "Pampanga," "Paragua," "Samar," "Callao" and "Arayat" were built for the Spanish Government during the years 1887 and 1888 at Cañacao, and the excellence of the work is attested to by the fact that the boats are still in service. If such work can be turned out locally, it is a strong argument for further patronage, instead of sending capital to China an Japan.

Besides the above mentioned gunboats, numerous small merchant vessels for the inter-island coasting trade, and lighters and cargo boats have been successfully built and engined from these shops. One of the gunboats, the "Bulusan," constructed for the Spanish Government was destroyed and sunk by the insurgents. The Company also built 12 steel and iron coal barges for the United States navy, shortly after the occupation, to the complete satisfaction of this exacting branch of our service.



U. S. GEODETIC SURVEY STEAMER "FATHOMER" AND COAL HULK ON SLIPWAYS

PRELIMINARY RECONNOISSANCE OF THE MANCAYAN-SUYOC MINERAL REGION,

LEPANTO, LUZON, P. I.—III

(By ARTHUR J. EVELAND, M. E., Government Geologist)

ON THE OLD SPANISH ROAD, MANCAYAN

Photo by A. J. Eveland.

COPPER MINES, MANCAYAN

CHAPTER VI

ORE DEPOSITS. MINERALOGY OF THE ORES, GANGUE MINERALS.—Under the head of gangue minerals are included those most intimately connected with the metallic minerals of the lodes, and which form the matrix of the latter. The term is used in its commonest sense, to signify the constituents of the lode that occur in intimate connection with the mineral under exploitation, and as the ores of this district are of a prevailing type, no ambiguity will result.

Quartz.—Comp. SiO_2, oxide of silicon=oxygen 53.5, silicon 46.7=100. Massive or in hexagonal prisms terminated by rhombohedrons. Often in double six-sided pyramids. Generally white or colorless. Hardness=7. Sp. gr., 26. Luster, vitreous, sometimes greasy. Transparent to opaque.

The quartz of this region shows essentially the same characteristics of vein quartz that occurs in most mining districts. There is present a comb-structure quartz showing "crustification," or banded-vein structure, having its origin in the filling of fissures either by growth in an open space or by slow expansion of a mere crack. The quartz of the Mancayan mines is hard, tough, compact, of a resinous luster, much shattered, and of a fine grain. The quartz from this locality is, from its observed nature, due almost entirely to secondary action of silicifying solutions. Replacement of other minerals and the filling of rock fractures have produced a quartzose mass, the bulk analysis of which shows a high per cent of silica. Such rock in thin sections under the microscope may reveal skeleton-like forms of crystals of other minerals, replaced entirely or partially by silica.

Almost without exception the vein-filling material of the region is quartz, the proportions of other minerals present being variable. There are, besides, occurrences of minerals other than quartz in that capacity which may be spoken of.

Barite.—Barytes. Comp. $BaSO_4$, barium sulphate, orthorhombric, commonly in tabular crystals, in divergent form, or massive. From its high specific gravity (4.5) it takes the name "heavy spar." Cleavage perfect in three directions. White. Transparent to opaque. Sometimes yellow, gray, brown, or red. Barite is less important as a vein material in this region, but its occurrence is noted.

Calcite.—Calc spar. Comp.—$CaCO_3$, calcium carbonate=carbon dioxide 44, lime 56=100. Rhombohedral. Cleaves perfectly in three directions producing rombohedrons. Commonly in this form, or prisms, scalenohedrons, or massive. Color variable, where impure, generally white or colorless. Transparent to opaque.

Unimportant as a vein material, though occurring throughout the district. Found in abundance as a microscopic constituent of lode materials.

Kaolinite.—Kaolin. Comp. $H_4Al_2Si_2O_9$ or $2H_2O.\ Al_2O_3.\ 2\ SiO_2$=silica 46.5, alumina 39.5, water 14=100. Monoclinic. In scales or plates, and generally in fine white powder. Occurs as clay-like masses, compact, mealy, or friable. H.=2-2.5. Sp. gr., 2.6.

This mineral occurs throughout the district, and especially in the Suyoc region, as a result of the decomposition of rock material, aluminous minerals, and feldspars. At Mancayan veins of several inches in thickness run through the upper trachyte; these are very pure kaolin, of a good white color. They crop out south of the village on the main trail.

Gypsum.—Comp. $CaSO_4$, 2 H_2O, hydrous calcium sulphate=sulphur trioxide 46.6, lime 32.5, water 20.9=100. Monoclinic, varieties selenite in transparent tabular crystals, to massive, often fibrous, cleavage on one plane eminent, giving foliated structure. H.=1.5-2. Sp. gr., 2.3. Luster, subvitreous to shiny. Color usually white; varieties, where impure, colored. Transparent to opaque. The occurrence of gypsum at Suyoc is suggestive of recent volcanic activity. In the gorges of the Pacat Rivers and other drainage streams of Suyoc hill occur numerous veins of gypsum,

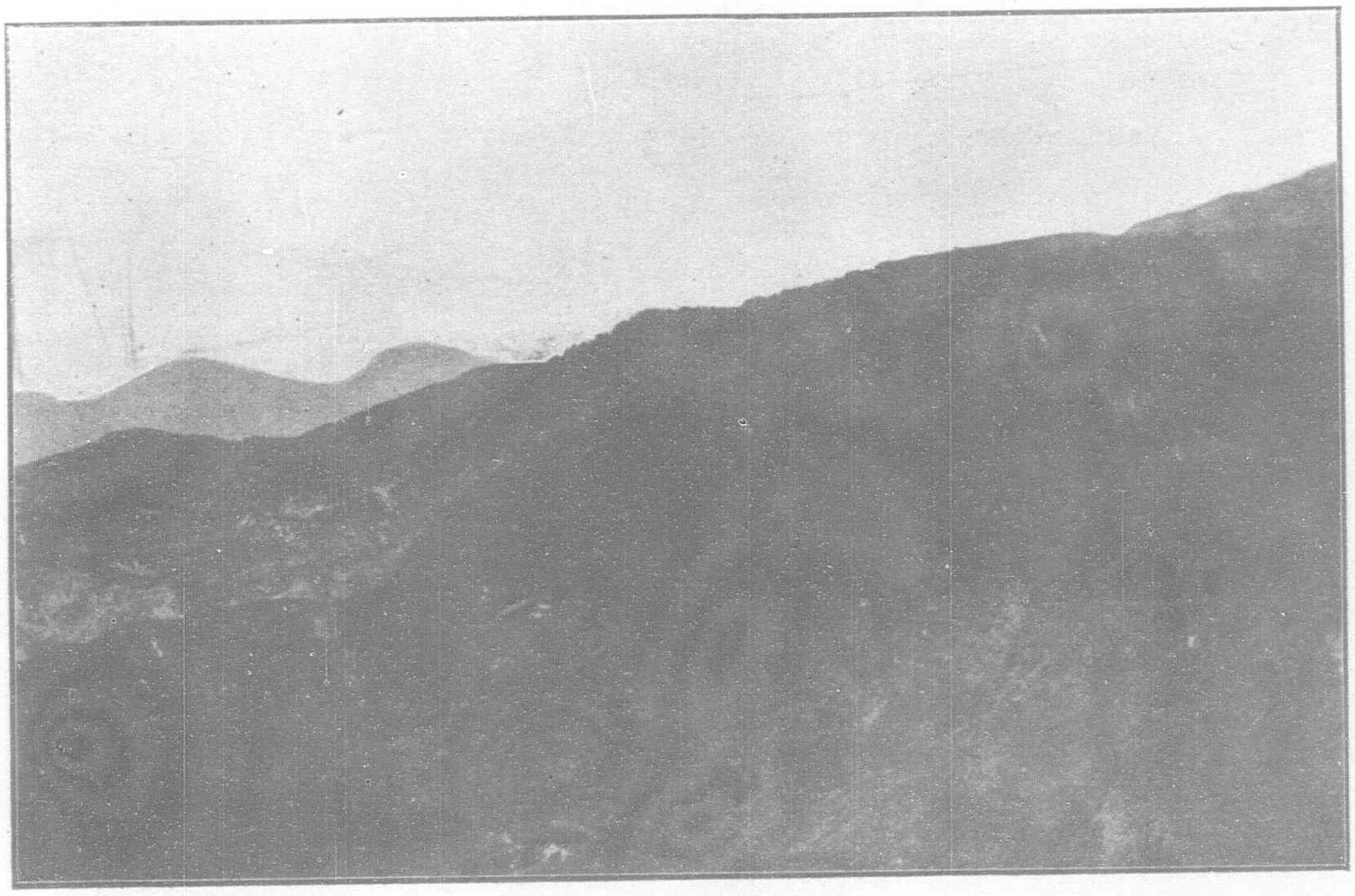


Photo by A. J. Eveland.

VIEW OF THE SEDIMENTARIES IN THE NAPACUAGAN VALLEY

often of considerable extent. These veins are of the fibrous variety, the widest observed giving a length of about 2 or 3 feet to the curved transverse fibers. Some of the rich values of that particular region were, it is claimed, taken from one of these veinlets.

ORE MINERALS.—This heading embraces the minerals of this district, which are generally mined for ores, or value of some nature, although it may be borne in mind that local conditions determine to a great extent just the heading that certain minerals come under. The minerals of this list, unless attention is called to it, have all a metallic luster.

Gold—Comp. gold. Isometric, but rarely showing crystalline form. Usually in irregular particles, filiform dendritic shapes, "wire" gold. Thin plates, rounded edges, and flattened grain or scales. Cleavage none. Fracture hackly. Very malleable and ductile. H.=2.5–3. Sp. gr., 15.6–19.3, 19.33 when pure. Luster, metallic. Opaque in ordinary masses.

In the Lepanto mining districts most of the attention has been directed to the free-gold workings.

At Suyoc, where visible gold is to be observed, the metal occurs in fine plates and grains in small quartz seams, in connection with sulphides of copper, zinc, and lead. The natives work only the free gold and have no knowledge of other values. Farther north the gold values seem to be more closely confined to iron pyrites, and less to the other sulphides. In Mancayan gold values are obtained from both the copper ores of the district and the quartzose vein matter of Mancayan and Tuboc.

Pyrite and marcasite.—Pyrites, "iron" pyrite, "white" iron. Comp. FeS_2, iron disulphide=sulphur 53.4, iron 46.6=100. Isometric, pyritohedral, cube and pyritohedron (pentagonal dodecahedron), octahedron, or combination of these, the common forms, sometimes striated. Frequently massive, and finely granular. Color, pale brass yellow to whitish. Luster, metallic. Opaque. H.=6. Sp. gr., 5. The common sulphide of iron here, as generally in mining districts, is common in all of the ores of the region, and to a greater or less extent present in the rock masses in the vicinity of the ore deposits. In this region the pyrites occur alone, in quartzose veins, associated or not, as the case may be, with other sulphides, and in the Mancayan ore, closely connected with the sulpho-salts of copper which constitute the ore of that region. While, as has been before noted, the pyrite of Suyoc is not worked for gold by the natives, not enough samples of it have been taken to demonstrate that it carries no values. As noted before, it is as yet undetermined just what relationship the pyrite and the gold values have but as this district opens up more information on the point will be obtained, it is presumed.

Galena or galenite.—Lead glance, "lead." Comp. PbS, lead sulphide=lead 86.6, sulphur 13.4=100. Isometric, cubes predominating. Perfect cubic cleavage. Massive, granular, or finely granular, occasionally fibrous. Color, lead gray. H.=2.5–2.75. Sp. gr., 7.4–7.6. Luster, metallic. Opaque. Generally argentiferous.

Galena is, compared with other minerals, not prominent in this region. On the Suyoc area alone it is observed, and here in connection with other sulphides in small amounts in quartz veins. Outside of the Suyoc area the quantity of galena occurring is practically negligible, so far.

Sphalerite.—Zinc blend, blende, black jack, "zinc." Comp. ZnS, zinc sulphide=zinc 67, sulphur 33=100. Isometric, tetrahedral, commonly massive; cleavage granular to compact. Brittle. H.=3.5–4. Sp. gr., 3.9–4.1. Luster, resinous. Color, commonly yellow to black. Transparent to translucent. Occurs in considerable amounts in the Suyoc area, in conjunction with sulphides of copper, lead, and iron.

Chalcocite.—Copper glance. Comp. Cu_2S=copper 79.8, sulphur 20.2=100. Orthorhombic crystals, pseudo-hexagonal, twinning. Massive granular to compact. Brittle. Luster, metallic. Color, lead gray, often tarnished blue or green. Opaque. H.=2.5–3. Sp. gr., 5.5–5.8.

Occurs in the Mancayan area with other copper minerals.

Bornite.—Purple copper ore, peacock copper. Comp., a sulphide of iron and copper, variable (Cu_3FeS_3=sulphur 28.1, copper 55.5, iron 16.4=100). Isometric, cubic. Massive, granular or compact. Brittle. H.=3. Sp. gr., 4.9–5.4. Luster, metallic. Color, copper red to brown, iridescent. Opaque.

Observed mineralogically, with other copper minerals of Mancayan.

Chalcopyrite.—Copper pyrite, yellow copper. Comp. $CuFeS_2$=sulphur 35, copper 34.5, iron 30.5=100. Sulphide of iron and copper, variable, due to admixtures. Crystals commonly tetrahedral. Massive, compact. Brittle. H.=3.5–4. Sp. gr., 4.1–4.3. Luster, metallic. Color, brass yellow, often tarnished. Opaque.

This is present in variable amounts throughout the district. Generally in quartz veins associated with other sulphides.

Tetrahedrite.—Gray copper. Comp. $4\,Cu_2S$, $SbS_2={}_3$sulphur 23.1, antimony 24.8, copper 52.1=100. Composition variable. Sulphide of copper and antimony. Isometric, tetrahedral. Rather brittle. Luster, metallic. Color, flint gray to tin black. Opaque, translucent (red) in thin splinters. H.=3.4. Sp. gr., 4.4–5.1. Arsenic and antimony are generally present and composition of this mineral is extremely variable. The high percentage of copper in this mineral (approximately 52 per cent), as well as its abundant occurrence in the mine

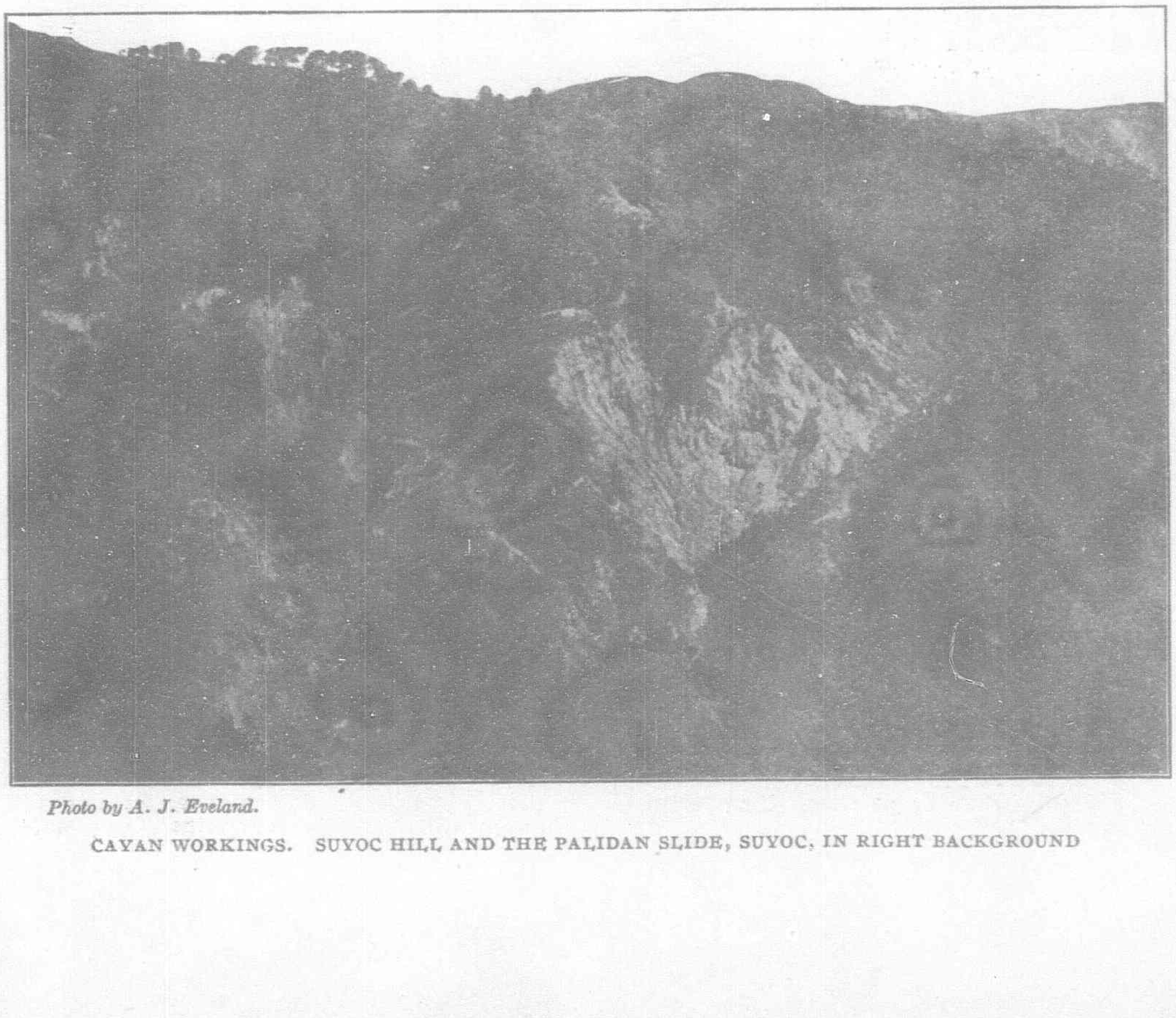


Photo by A. J. Eveland.

CAYAN WORKINGS. SUYOC HILL AND THE PALIDAN SLIDE, SUYOC, IN RIGHT BACKGROUND

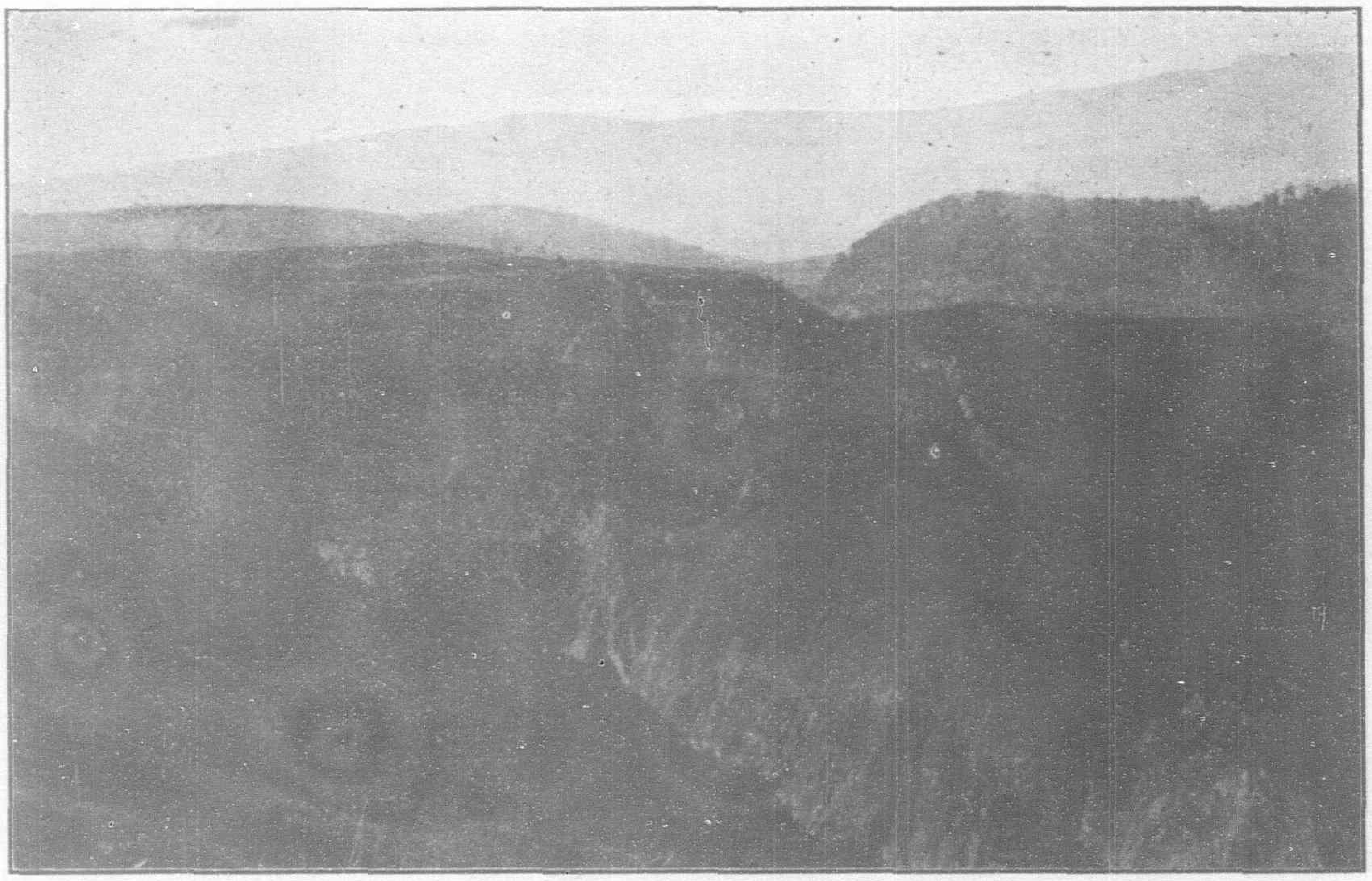


Photo by A. J. Eveland.

WESTERN PORTION OF PALIDAN SLIDE

of the Cantabro-Filipino Company at Mancayan, makes this one of the most important of the region. It is also found in the Suyoc area, on varions claims of that region.

Enargite.—Comp. Cu_3AsS_4, or 3 Cu_2S, A_2S_5 =sulphur 32.6, arsenic 19 1, copper 48 3=100. Orthohombric, crystals usually small and striated. One perfect cleavage. Brittle. H.=3. Sp. gr., 4.43-4.45. Luster metallic. Color, grayish black to iron black. Opaque.

This mineral, as well as tetrahedrite and other copper-sulphur salts, constitutes the greater part of the large ore body of the Mancayan mine. Occurring with this is luzonite, composed essentially as enargite, but differing in crystallization.

Several analyses of the typical ore from the Mancayan mine are given below:

	I.	II.	III.	IV.	V.
	Per cent.	*Per cent.*	*Per cent*	*Per cent.*	*Per cent.*
Insoluble residue	......	49.19	55 93	66.72	30.10
Silica	47.66	45.91	45.31	64 53	23.40
Sulphur	24.44	20 36	15.40	12 98	23.58
Antimony (metallic)	5.12	None	None	None	None
Arsenic (metallic)	4 65	2 26	.43	1.80	.40
Iron (metallic)	1.84	14.25	8.98	8.96	11.13
Copper (metallic)	16 64	18.90	16.54	9.72	32.92
Lead (metallic)	......	None	None	None	None
Loss	.25	......	......	......	......
Total	100	99 96	97.28	100.18	98.13
Gold (ounce)	......	0.23	0.16	0.08	0.04
Gold value, at $20.67	......	$4.75	$3.31	$1.65	$0.83

No. I is from Santos's Informe (p. 38) and is given as the mean composition of the different ore breasts of the native workings.

II is a piece of *ore* from the "Carmen" workings of the Santa Barbara mine, Mancayan, selected as typical.

III is a sample taken of the ore the natives (Igorots) use in their smelting, probably from different portions of the Mancayan mine.

IV is another sample taken as typical of the "Santa Barbara" ore.

V is a rounded bowlder of apparently almost pure copper mineral; to the glass it reveals only crystallized enargite, with some very slight amount of quartz and an occasional bunch of chalcocite.

It is not known by whom the analysis was made for Mr. Santos. The analyses numbered II to V, inclusive, are from the Bureau of Government Laboratories, Manila, to which work of this character is submitted.

Another specimen of ore was examined mineralogically by Dr. W. E. Ford, of Yale University, with the following result:

> The specimens show the characteristic crystal of enargite in the cavities. They are elongated parallel to the vertical axis and show their orthorhombic character by the shape of their cross section. For the most part the faces are not well developed, the prism zone showing the deep striations characteristic of the mineral. The blowpipe tests agree with those required by enargite.
>
> The most prominent mineral of the specimens is a massive mineral which on a weathered surface has a dull-bronze color, but which on a fresh fractures hows a reddish gray tone. No evidences of crystallization could be discovered. Its fracture is uneven. Its blowpipe and chemical reactions are identical with those of enargite; it decrepitates in the closed tube andgives sublimates of sulphur and arsenic sulphide; with nitric acid and ammonia it gives the deep-blue solution indicating copper. Its appearance and reactions agree with those described for the mineral luzonite.

It seems rather remarkable that none of the four analyses above quoted show any traces of antimony, as between the arsenical and antimoniacal sulpho-salts of copper there is a constant variation and transition, and rarely, if ever, is one known without the other. Santos gives 5.12 per cent of antimony, and it seems highly probable that this better represents the composition of the ore. The analyses, however, are quoted as reported.

Of superficial decomposition products there is in this region but little trace; occasional bunches of iron and copper carbonates and sulphates are found, but only in limited quantities. The geology of the region, as will be shown later, precludes any oxidized croppings of any but occasional veinlets, and, except for scattered points and sections of the underground workings of the old Mancayan mine, decomposition products are singularly lacking.

DISTRIBUTION AND RELATIONS OF VEINS.—Of the ore deposits in the Lepanto area, and in fact in northern Luzon, that of Mancayan has been most known and is most prominent. The occurrence there of copper ore has led to further search in the vicinity, and while the Mancayan deposit is at present far beyond any other locality in size and value, the future may develop more extended masses of ore here or in other localities.

The Mancayan deposit has been uncovered for a long time by the Mangambang (Igorot, meaning "copper") River cutting a deep gorge diagonally across the southeast end of a quartzose mass bearing copper ores. At this place there is a nearly vertical wall of 100 or 200 feet, the strike of which, coinciding approximately with the course of the river, is north west. From mining operations of past years there is a heavy talus and dump pile, and the face of the cliff is pierced by numerous tunnels, some of them mere dog holes, others cut with precision and good workmanship. Several systems of levels explore most of the ore body, the lowest one serving for the purpose of drainage. In the many years of operation of this mine several thousand feet of workings have been made and a considerable amount of ore extracted.

There is no indication of a regular form to the deposit, except that from a tunnel on the west side of the northern extension of the main deposit it is seen that the quartzose mass evidently dips 10° to 15° to the east, resting on the Mancayan diorite.

Much of the mine was flooded at the time of the visit, and without maps of the workings other than the one included in the report which was made of some of the principal galleries, it is only possible to draw general inferences as to the nature of the deposit.

The siliceous mass constituting the outcrop is apparently the same in character as the quartz porphyry described under "Rocks." At the Mancayan mine it loses its lithoidal nature and consists more or less entirely of quartz and ore minerals. The quartz has been previously shattered and jointed in every direction, and the cracks filled with either secondary quartz or ore minerals, notably pyrite, marcasite chalcopyrite, and enargite. The mass at present is hard, compact, and firm, woven through with irregular veins of ore, with no system of distribution. The fissures, broadly speaking, have west-northwesterly and northeasterly directions, and of these the ones striking west-northwest seem to be most prominent as ore carriers.

The fissures would suggest contraction types due to cooling of an igneous effusion, dehydration of a mass, or some similar phenomenon, rather than those produced by dynamic causes. The fracturing has no other pronounced direction than that noted, and even this appears more or less forced.

This fracturing seems not to be confined entirely to the ore body, but is a characteristic of much of the surrounding rock mass. There is apparently no profound fissuring or faulting in the locality, and as yet no evidence is available that other displacement than the local fractures of the Mancayan ore deposit exist.

The "veins" formed by the recementation of the quartzose mass by silica and metallic sulphides vary from finger-breadth cracks to one body (the largest opened) over 20 feet across, of lens shape, of limited depth and length. There is no continuity of these singly, and the workings therefore follow the Spanish method and are crooked and narrow, following rich seams.

Unfortunately for a thorough investigation, many of the galleries were flooded or caved, and the exact relation of the deposit could not be made out. One important observation is worth recording: The lowest tunnel, a regular and large gallery, driven for drainage, has in its present length, and in the side drifts, which are under the greater part of the other workings, no signs of ore—in decided contrast to the rich values of a few feet above; the explanation of this is not certain.

From the nature of the ore masses, it is evident that the enargite and chalcopyrite and some quartz have been formed around the earlier particles of pyrite and quartz. The enargite is well crystallized and undoubtedly later than the pyrite, inclosing the latter.

From the few assays made it would seem to be indicated that the values in gold come from the pyrite, as the assay of a bowlder of almost pure enargite from the mine gives but little value, those samples of which a portion was pyrite showing values up to $5 a ton in addition to their copper content.

In the immediate vicinity of Mancayan there are but few openings of any depth or length, and only negative results are obtained from these. The western slope of the hill is predominantly an outcrop of the quartz porphyry, copper bearing to a mile north of Mancayan mine in variable amounts, and so far as shown decreasing in content to the north. No shafts deeper than a few feet have been sunk over the deposit, or in its vicinity, and these reveal only the soft material derived from the weathering of the trachyte. The tunnels on the east slope of the hill are driven in Mancayan diorite, and when the party left the field were still in that material, so that, except from the Mancayan mine proper, nothing is known of the extent of the deposit.

On the north slopes of Mancayan hill crop two exposures of the same vein, a 2-foot fissure of quartz, heavily loaded with pyrite and some chalcopyrite, the strike of which is east and west. No exploration has been made of this.

South of Mancayan, just west of Tuboc, conditions similar to those of the Mancayan outcrops prevail. There is there a standing face, 150 feet in height, of the same quartzose mass, but the rich ore seems entirely lacking, and the tunnels driven into it to the west so far have not shown other than promising indications.

At Cayan large slides and workings indicate that formerly values were sought, and the quartz-mass outcrops are of a slightly different character. The rock is more cellular in structure and is impregnated with pyrite only. Gold values obtain, and it is stated by reliable authority that these ores were mixed with the Mancayan ores in the blast furnace, on account of their siliceous and pyritiferous character. As the ground is well covered with Spanish pertenencias, no prospecting work has been done of late years.

The ores of the district alter perceptibly as more southerly points are reached, and in addition to the change noted at Cayan, Suyoc and its surrounding territory offer a decided contrast to the Mancayan type.

North of Suyoc, between it and Cayan, the ore-bearing veins are well-defined quartz leads, of small width, generally not over 3 feet, with a content of lead, zinc, and iron sulphides. No general direction of these veins can be traced, but it is the opinion of several of the miners in the district that those corresponding more closely to an east and west strike give the greater values. The length of the veins is limited and no depth beyond a few feet has yet been explored. The "country rock" is here the Mancayan diorite, much decomposed and altered, and the presence of veins of gypsum up to widths of several feet is noteworthy. Several acres of this territory have been cut down rapidly by the combined efforts of the rainy season and the Igorots in their workings, and an enormous slide results, the material being washed down the narrow gorge to join the Maanse River. Every rainy season the Igorots impound this water at the end of long ditches, "boom" away the overlying muck, and obtain a considerable amount of free gold by crushing and panning the vein material. It may be noted in this connection that an assay of the material the Igorot discarded as of no value yielded 0.20 ounce of gold per ton, a value of $4.03. Numerous pockets have been found in this slide that were surprisingly rich, it being stated that 20 *pounds* of metal was taken from one such occurrence a few years ago.

The Suyoc hill deposits, as yet only partially prospected, have the same general character—quartz veins of no great width, carrying metallic sulphides and a considerable gold content, most of it in a free state. In two notable instances, on the "Eureka" claim of Mr. C. A. Pettit and the "Quien Sabe" of Mr. Albert Wright, copper sulphides form a great proportion of the vein filling, and these and the other properties are being developed by tunnels.

All along Suyoc hill, west and south of the Abra River, are large eroded cirques, owing their existence primarily to ancient workings, and all of the same general type.

In view of the fact that the entire region, with the exception of the one ore body of the Mancayan mine, is in an early stage of development, it is impracticable to treat the ore deposits in detail. It seems to be fairly conclusive, however, that the general type of vein in the district is a narrow quartz lead, carrying metallic sulphides, in some cases of copper, and generally with gold associated in a free state. These veins are in the Mancayan diorite which underlies the entire district. With the advent of the trachyte flow, metamorphic changes have taken place, and the nature of the country rock altered to a considerable degree.

It would be rash to enter into a discussion of the genesis of the deposits on the meager data available, and in consequence such will be left to more complete reports that will follow detailed geological work upon a topographic base.

The former attempts to explain the Mancayan deposit have been given and objections to each have been found, and as a mere tentative hypothesis may be suggested a genesis of these ores as yet not considered, that will be determined when further development work is done. It is entirely within the grounds of probability, and not in conflict with any geological evidence so far at hand, to presume that, before the advent of the trachyte flow, ore deposits had been formed in the Mancayan diorite of a type similar to those at Suyoc—quartz veins carrying metallic sulphides and gold values. With the covering of

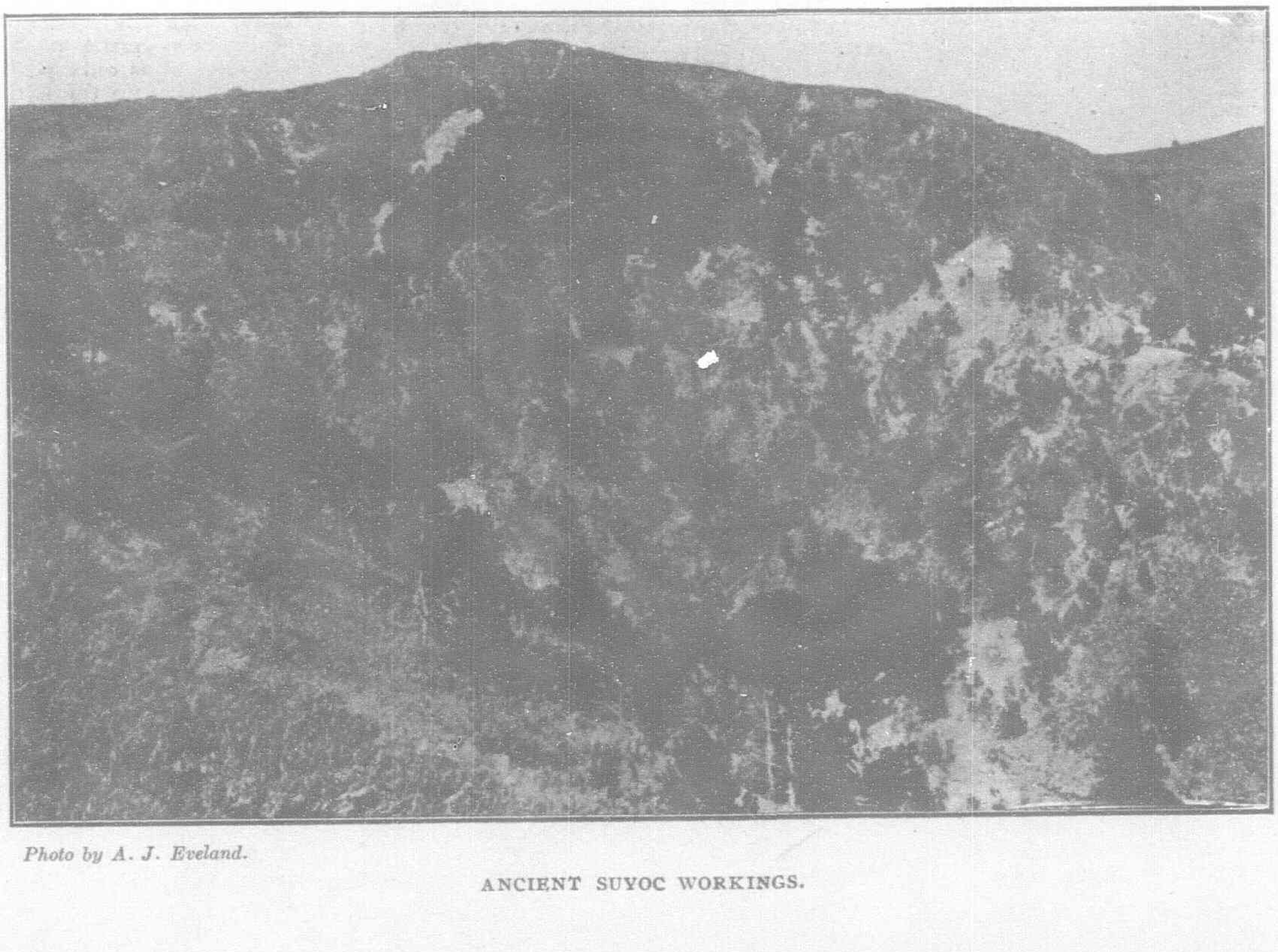


Photo by A. J. Eveland.

ANCIENT SUYOC WORKINGS.

the diorite and its veins by an igneous flow, chemical action was given an added impetus. The trachyte, easily decomposed and altered, was metamorphosed at its contact with the diorite to a hard, flinty, siliceous quartz porphyry, quartz replacing most of the other constituents of the rock. In its cooling and subsequent contraction fissures and crevices were formed, aided possibly by dynamic action, such as shattering shocks, which are a feature of the Islands. The heat of the overlying trachyte furnished a motive power for the process of vein deposition, and the heated waters, assumed to be rising, filled the cavities and cracks with silica and ore minerals obtained from lower or surrounding sources. Enargite is a prominent mineral among those formed by secondary action, and investigation shows that it has been formed later than the other minerals; so that the evidence points to a secondary enrichment of certain portions of the contact, notably at Mancayan, with copper minerals obtained from other sources. Deposition has taken place in all possible directions, leaving the irregular mass of veins of the Mancayan mine.

There is nothing in this hypothesis to preclude the possibility of other similar deposits in other portions of the area, or, indeed, of one or more veins, as yet not opened, in a more or less vertical position, which may occur under the trachyte, in the diorite, and which afforded a main trunk channel for the ore-depositing solutions. Where erosion has been sufficiently deep to cut down near the diorite, such deposits may be revealed, but it is obviously useless to prospect in the trachyte surface, which is easily recognized by its granularity, color, and weathering to a characteristic clayey soil. Deep shafts *through* the trachyte, or proper crosscuts, at a depth easily to be obtained, will afford the only solution of the future of this district, and it is to be hoped that the efforts of those at work will be carried on to completion.

GERMAN ELECTRICAL PLANTS IN CHINA

The China Technical Bureau of Siemens Schuckertwerke, under the direction of Mr. Hermann Meyer, M. E., E. E., has been successful in securing many new orders for small lighting and power plants, in the last year.

In addition to the central station plant for the German Concession of Tientsin, Mr. Meyer recently closed an order for a 40 kw. lighting and power plant for the Chinkiang Mint, similar in design to one installed in the Kiangse Provincial Mint by the same firm. The plant for the Canton Arsenal, consisting of a 100 H. P. boiler and 70 kilowatt direct connected generating set, has just been installed. This will supply current for 1000 lamps, and several motors distributed through the workshops.

Another 50 H. P. direct connected set has been erected at the Kiangnan Dock and Engineering Works at Shanghai, and a 35 H. P. lighting set for the Imperial Mint at Tientsin.

One of the most important orders for electrical supplies, recently placed in China, fell to this company, consisting of all the material for the outside construction and wiring for lighting the city of Chinan-fu, capital of Shantung Province. The company controlling the lighting of this city is native, and purchased the boilers, engines and dynamos second hand. The contract for the new switchboard and necessary wiring supplies have gone to Siemens Schuckert.

Other contracts comprise a small lighting plant for the Po Shan Glass Factory, located in Shantung between Chinan-fu and Tsingtao, and the wiring for the new Club Concordia in Shanghai. This handsome building now nearing completion will be lighted by 800 lamps and have electric service and passenger lifts. The library and reading rooms will be lighted by reflection, the lamps being concealed in the cornices and throwing the rays upward to the ceiling.

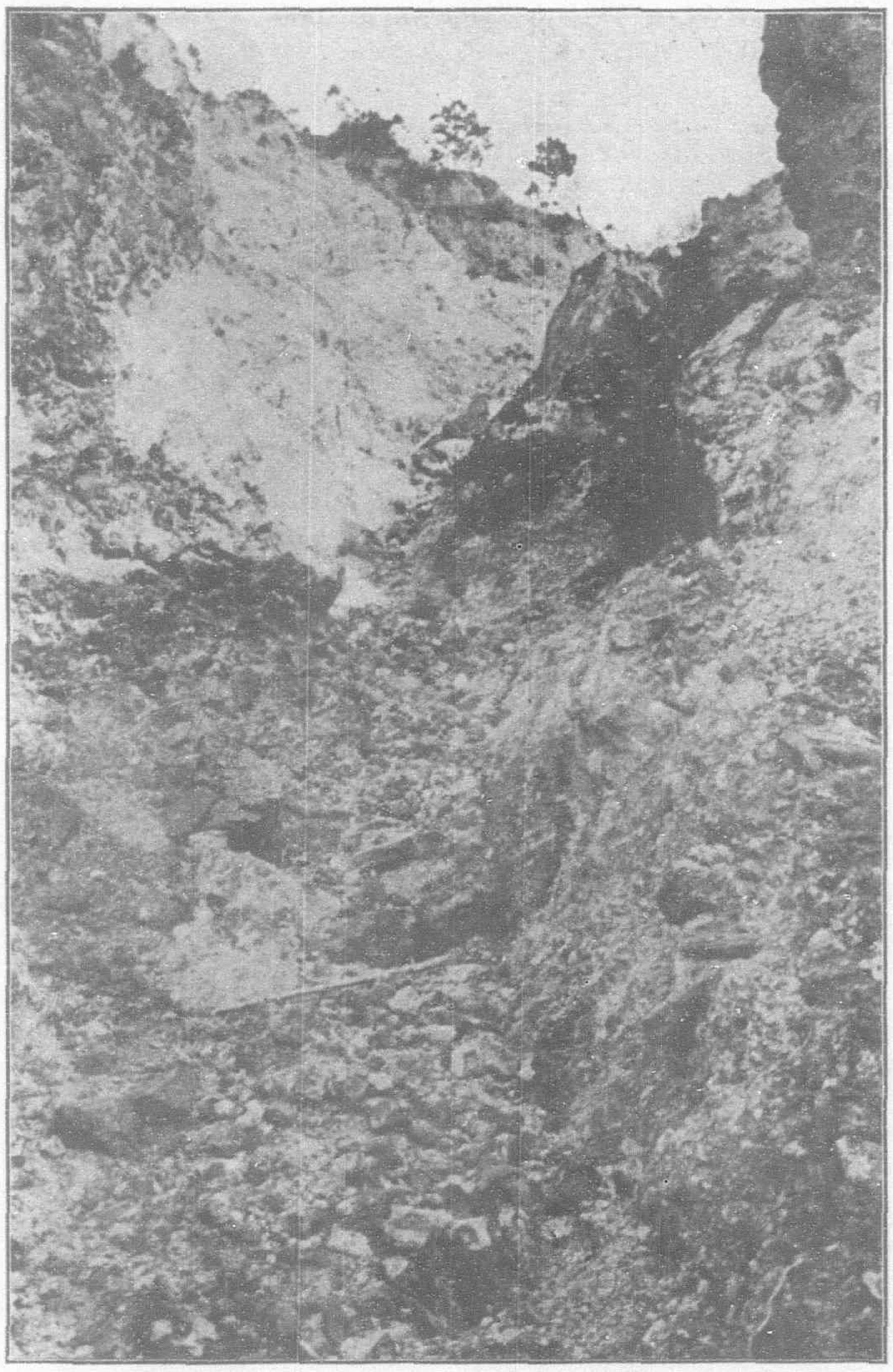


Photo by A. J. Eveland.

OLD NATIVE WORKINGS ON QUIEN SABE VEIN, SUYOC.

SOUTH MANCHURIA RAILWAY CO., LTD.

Tokio, June, 15.—The formation of a great corporation for the development of South Manchuria is announced by an Imperial Ordinance in the *Official Gazette*, the object of the Corporation being the working of the collieries and railways of Manchuria.

The Imperial Ordinance gives the regulations for the formation of the Corporations which read as follows:—

Article I.—The Government establishes a company under the style of the Minami Manshu Fetsudo Kabushiki Kaisha (South Manchuria Railway Company, Ltd.) to carry on railway traffic.

Article II.—The shareholders of the Corporation shall be exclusively the Japanese and Chinese Governments and the subjects of Japan and China. No person of other nationality shall be allowed to hold the Corporation's shares, upon which shall be inscribed the names of the holders.

Article III.—The Japanese Government may substitute railway and other property already in its possession in Manchuria as its share of the capital of the Corporation.

Article IV.—The Corporation may issue in instalments shares to the total amount of capital to be engaged from the public, providing the amount of the first issue shall not be less than one-fifth of the total capital to be called.

Article V.—The amount of the first call may be reduced to one-tenth of each share value.

Article VI.—The head office of the Corporation shall be at Tokyo, with a branch at Tairen.

Article VII.—One president, one vice-president, not less than five directors, and from three to five inspectors shall be appointed.

Article VIII.—The president shall represent the Corporation and supervise its affairs. In his absence the vice-president shall act. The latter and the directors will assist the president and control the various departments. The inspectors will act as auditors, etc.

Article IX.—The president and vice-president shall be appointed by the Government with Imperial sanction and their term of office will be five years. Directors shall be appointed by the Government from among shareholders holding more than fifty shares, their term of office to be four years. Inspectors shall be elected at a general meeting of shareholders from among themselves, their term of office to be three years.

Article X.—The salaries and allowances of the president, vice-president, and directors shall be determined by the Government.

Article XI.—These officers, during their term of office, under no pretext whatever, shall accept any other office or engage in any other business without the approval of the Government.

Article XII.—The Government shall appoint officials empowered at any time to inspect the books and the operations of the Corporation. They shall also be authorized to demand at any time at their discretion a written statement of accounts or of the business of the Corporation; and further to attend and state their views at general meetings of shareholders and other meetings. They will not, however, be empowered to vote at meetings.

Article XIII.—The Government will issue such orders as may be deemed necessary for the control of the Corporation and its business.

Article XIV.—If the Corporation by a vote, or the officials act in violation of the laws or orders of the Government or the objects of the Corporation, or if the Corporation fails to carry out the orders of the authorities supervising the business, the Government will abrogate such vote and may dismiss the officials culpable.

Article XV.—The Government may apply when deemed necessary the laws and ordinances relating to railways in the Empire to the business of the Corporation. Due notice will be given the Corporation of the laws or ordinances to be applied.

Article XVI.—The commercial code and laws and ordinances appertaining thereto shall be applied to the Corporation, in cases where provision is not made in the present ordinance.

Article XVII.—Imperial Ordinance No. 366 (relating to Japanese companies constructing railways abroad) will not be applied to the Corporation.

Supplementary rules have been issued to the foregoing ordinance by which the Government will appoint a committee for the conduct of affairs relating to the formation of the South Manchuria Railway Company, Ltd. The promoting committee shall issue the first shares after drawing up the Articles of Association and obtaining the approval of the Government thereto. After the issue of the first lot of shares the promoting committee shall apply to the Government for a charter, producing the applications for allotment. The committee shall make the first call on the shares without loss of time after obtaining the charter, and the first call having been paid in the committee will call a general meeting of shareholders. Upon the conclusion of the inaugural general meeting the work of the promoting committee will be taken over by the President of the Corporation and the committee be dissolved.

It is semi-officially explained that the Japanese Government cannot properly hold railways and collieries in Manchuria, over which Japanese suzerainty is not established, as in Corea, without prejudicing the sovereignty of China. In the treaty signed at Peking by Baron Komura it is agreed that a company shall be formed, capitalised jointly by the Japanese and Chinese Governments and people, to conduct the Chinese Eastern Railway, after the evacuation of Manchuria by the Japanese troops. The formation of the new company is an outcome of the treaty. It is further stated that the promoting committee will be appointed in a few days, and a valuation will be made of the Chinese Eastern Railway, the Fuchung and Yentai Collieries, and works at Tairen. The capital of the new company will be fixed at Y 150,000,000. The railway and other property held by the Japanese Government in Manchuria will be valued at Y75,000,000, and the Government will take shares in the company to this amount. Shares will be issued for the remaining Y75,000,000, which will be issued for the improvement of the railways, the construction of rolling stock, and as a working fund for the collieries, etc.

Several names have been nominated for the presidency and vice-presidency of the company including those of Mr. Oura, ex-Minister for Communications; Mr. Den, ex-Vice-Minister for Communications; Mr. Sengoku, President of the Kiushu Railway; and Viscount Hotta, a member of the House of Peers.

JAPAN'S RAILWAY PROBLEMS IN MANCHURIA

It is evident from accounts received from Manchuria, says a Peking letter, that Japan will have to spend much money on railway betterments before her principal holding is of much value. The first great question, naturally, is whether the Japanese will change the narrow 3′ 6″ gauge to the 4′ 8½″ standard gauge. If they make this change, in addition to all their other expenses, they will have to invest at least £1,000,000 in providing entirely new rolling-stock to replace that which they borrowed from their own railways in Japan.

The first of these, and one of the most expensive, is the replacing the embankments, bridges, culverts, and rails between Changtu and Kungchuling. The Russians utilized the ample time given them by the slow Japanese advance to rip up a 50 m. gap on the railway and to carry all the rails and steel work far back into their own bases. It is this gap beyond the Japanese front which will have to be mended at Japanese expense. From a £250,000 to £500,000 will be necessary for this.

The second expense is the repairing and re-building of stations, and the repairing and improvement of the godowns and railway property. This if carried out along the whole 450-ms. of the main line, will necessitate the disbursement of another £500,000.

The third expense is the completion and improvement of Dalny, which must be attended to, since unless this Russian failure can be turned into a Japanese success within 2 or 3 yrs., it will be a white elephant in the government's hands. This expense then must be entered into without delay. The most conservative estimates hold that another £500,000 will have to be put into Dalny at once and a further £500,000 expended slowly during the next 5 or 6 yrs.

The fourth expense is the development of the railway coal mines. There are three of these mines: The Fushun, the Yentai, and Wafangtien. Of these three, under the Russian régime, the second mine, the Yentine, was the biggest producer, but the Japanese have already shown a strong inclination to push the Fushun mine and to look after the other two very slightly. If they develop the three simultaneously in order to take coal, one of the great articles of freight, a further £500,000 will have to be sunk in machinery and installation of improved appliances.

Thus making the trunk line a standard-line; completing the gap made in the N.; repairing and rebuilding stations and railway properly, modernizing the Port of Dalny, and developing the coal mines and giving them improved appliances and rolling stock, will absorb a sum which may vary from £2,000,000 to £4,000,000 according to the thoroughness with which railway affairs are attended to. With all this additional money sunk in Southern Manchuria the Japanese Government will have to strain every nerve to make the railway a paying proposition. How will it act?

Russia spent 160,000 *yen* a mile for the construction of the railway from Dalny at Changohun, a distance of 500 miles. The line may therefore be assessed at 80 million *yen*. Taken together with the prospective disbursements enumerated above, the capital of the railway may be put at 120 million *yen*.

Receipts from the railway will be as follows:—

	Yen.
Freight on beans (amount, 2,510,000 *koku*)	3,200,000
Freight on coal (2,000,000 tons)	8,000,000
Passenger receipts	1,800,000
Total	13,000,000

The running expenditure will amount to 7 million *yen*, so that a balance of 6 million *yen* may be netted as profit. Moreover, the profit from by-works will amount to 1,500,000 *yen*, including a million *yen* from the colliery and 500,000 *yen* from the settlements and warehouses. The total profit will reach therefore 7,500,000 *yen*. Of this sum, 3,200,000 *yen* may be paid as a preferential dividend of 8 per cent on the new capital amounting to 40 million *yen* and 800 000 *yen* put aside as reserves. The balance, 3,500,000 *yen*, will represent the Government's income accruing from the existing railway, valued at 80 million *yen*, the rate of interest being about 4.3 per cent.

There can be no doubt that large quantities of coal will be moved down the line regularly, as soon as the evacuation is complete, and that the export of coal from Dalny will be attempted on a very large scale during the winter months The Fushun mine is at present producing 1,000 tons of coal a day. It is not too much to expect that the various coal mines will be placing 3,000 or 4,000 tons of coal at the pit-heap a day in less than a year's time, and that half of this amount will be available for export. It is quite certain that Dalny will be the principal shipping point, and that coal will flow from here all over the N. Far East. This will be one source of profit.

The large number of trucks which will be constantly entering Dalny will be able to allow return freight of a coarse kind to travel back to the vicinity of Mouken for next to nothing; and therefore people must be prepared to see the Japanese Government offering the very greatest inducements to its subjects to settle in Dalny, and from there to conduct the import trade of Manchuria to the detriment of Newchwang.

Then it must be remembered that at Ta Shih-chiao, Liaoyong, Moukden, Tiehling, Kaiyuan, and Changtu, the government will be able to lease to its own people the immense military godowns constructed by both the Russians and the Japanese places which can be turned into excellent depots for the collection of Manchuria's raw products and the shipment to the seaboard. All this will be in purely Japanese hands and, *pace* the cry of the open door, no others but Japanese need apply for floor space. Japanese banks established at all these centers will give the best possible facilities to their own people, and, therefore, godown-room, financing and goods carriage in her own hands, Japan will attempt to create one of those hidebound monopolies which a study of her present condition shows that she dearly loves.

That, of course, is only one side of the picture; for it remains to be seen how much the competition of the purely Chinese railway on the other side of the Liao River, will tend to diminish the profits of this subtle speculation.

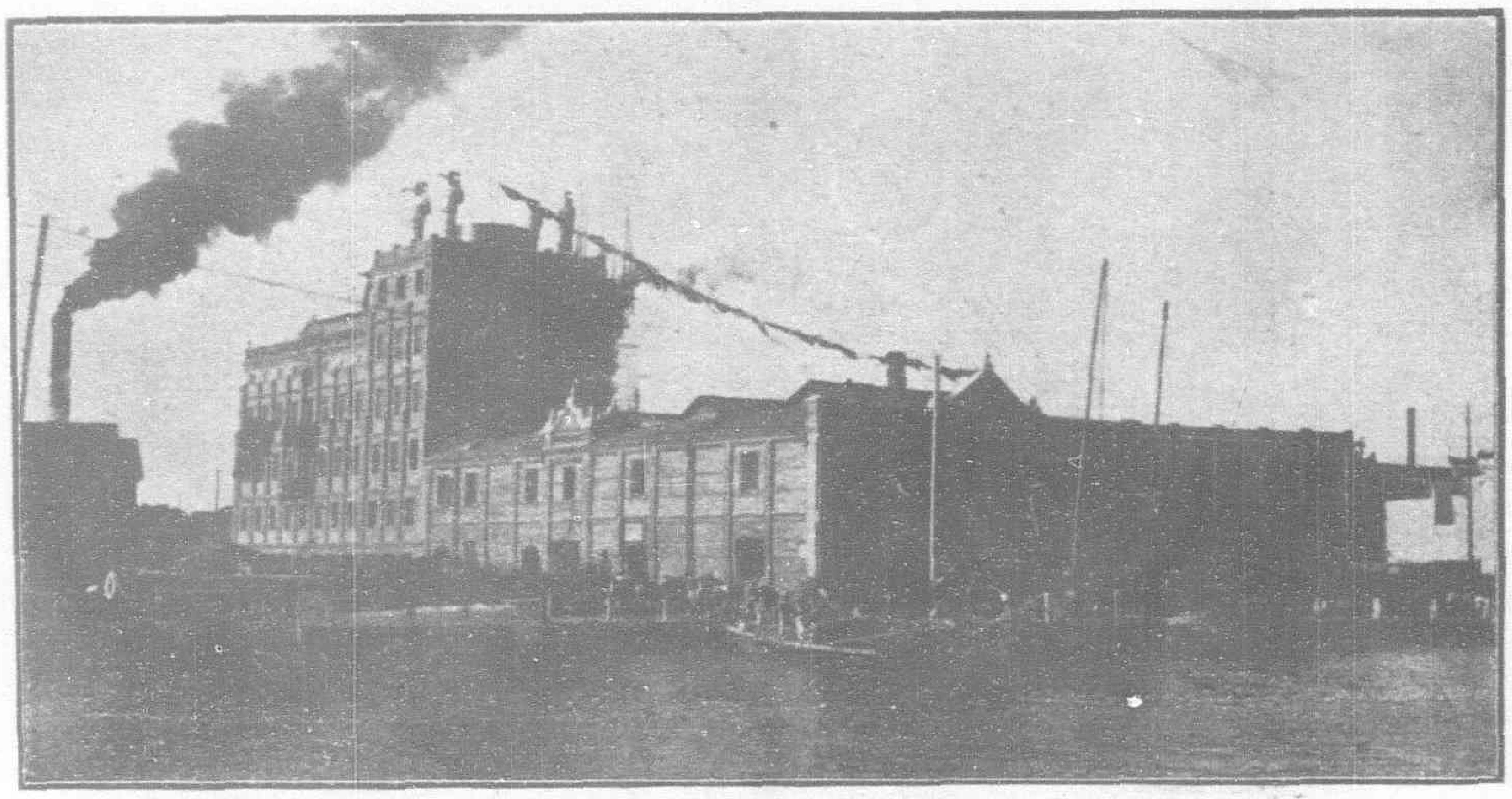
Refuse Destructor Hongkong—At the meeting of the Legislative Council this afternoon, the following report of proceedings of the Public Works Committee at a meeting held on the 21st inst., was laid on the table and adopted by the Council:—

The committee had before it a scheme for reclaiming an area of land immediately west of Cadogan Street and of Chater Street (extended), and erecting on this a destructor capable of dealing with 100 tons of refuse per day, together with quarters for a superintendent and 300 coolies, the estimated cost being as follows:—

Reclamation of site, including 50-foot road in extension of Chater Street	$160,700
Destructor buildings, including piled foundations, chimney, approach road (incline) and iron boundary fence	98,100
Machinery, including 12 cells and furnaces with fan and engine, two boilers, slab-making machine, tram-lines and trucks, etc	82,500
Quarters for superintendent	15,000
Do. 300 coolies	75,000
Total	$431,300

After full discussion, it was resolved unanimously that the committee are prepared to recommend, in principle, the provision of a destructor for dealing with the refuse of the City of Victoria, but advise that, before any further steps are taken, the makers of the type of destructor which it is proposed to adopt should be requested to send out a representative to investigate local conditions and submit a tender, accompanied by a guarantee for three years, for dealing effectively with 100 tons of refuse per day.

Japan Sugar Refining Company.—The Board of Directors of the Japan Sugar Refining Company, of Tokio, who are opposed to the incorporation of their company with the Sugar Refining Company of Osaka, as advocated by the majority of shareholders, sent in their resignations *en bloc* at a general meeting of the company on the 18th inst.



YUEN CHONG FLOUR MILL, SOOCHOW CREEK, SHANGHAI

YUEN CHONG FLOUR MILL, SHANGHAI

The erection of a new flour mill in Shanghai for Mr. Yuen Chong has been completed and the building fitted throughout with the latest and most up-to-date machinery and plant. The mill is situated directly facing Soochow creek and occupies a prominent position at the corner of the North Soochow and Winchester Roads. The main building is five storeys in height and has a length of 68 feet, width 44 feet, and a total height of 68 feet, and a large erection at the south end of the mill containing the machinery and cleaning departments. Its length is 44 feet, width 28 feet, and height 72 feet, and at the top a huge water tank is situated for use in case of fire. In the basement are to be found the elevators, main line shafting and the elevators and spouts from the roller mills which are situated on the first floor. The second floor contains the purifiers and on the third floor are to be found the Reliance Sifters, also fan and dust collector for roll suction. On the fourth floor are located the centrifugal reels, scalper, dusters and flour dressers. The top storey contains the elevator heads by which means the wheat is carried direct from the warehouse on the surface and delivered at the receiving separators on the fifth floor. First the wheat passes into the storage bins, then through the milling separators, cockle machine and scourers until perfectly clean and ready for the mill. The grinding is then commenced, the break rolls coming first into use and then the roller mills. The total capacity of the mill is estimated at about 1800, 50-lb bags a day of twenty-four hours. Messrs. Jardine Matheson and Co. have supplied the entire equipment. The machinery for the flour milling was purchased of Allis Chalmers and Co. of Chicago, while the purifiers are of English manufacture, the completed installation being of the most modern, perfect and complete plants that it is possible to obtain and undoubtedly the best in China.

OOLONG TEAS

Former Consul Anderson, of Amoy, has furnished an interesting report to Washington on the manufacture of oolong teas with the object of showing that such teas may be profitably produced in the United States. Mr. Anderson writes:—

It is impossible at this distance to express an opinion of value as to why American experiments in the manufacture of oolong teas have so far been of doubtful success. In the manufacture of tea so much depends upon little things which affect the exact chemical or physical condition of the leaf that even where the leaf itself and the general process itself are the same there may be important differences in results because of very slight variations in conditions. In teas of the hand-cured varieties no opinion but that of experts actually familiar with processes and leaf in both countries concerned can be relied upon safely. It is possible, however, that even a general description of how oolong teas are cured in Formosa may furnish some hints which may be of value in the experiments which are being continued in the United States.

It may be said, in the first place, that Formosan plants used for oolong teas are more rank in their growth as a rule than the Hangchow teas used in the United States for such teas, but possibly this is due more to the climate of Formosa being much more damp and much warmer than the American fields than to any great difference in the plants themselves. The leaf is handled less expeditiously in Formosa than it seems to be in the United States. It is picked by women and children mostly, and as picked it is placed in closely woven baskets, which are sometimes lined with jute cloth.

CURING THE LEAVES.—Where delivered by the pickers to the curing house, the leaves are spread out in the open air, in the sunshine, if possible, on a bamboo mat or in low bamboo trays, and are there stirred every 5 or 7 mins. until the leaves are somewhat wilted, the edges pliable, and signs of fermentation are visible. The length of time required for this depends upon the sun, temperature, and similar conditions. The tea is then placed in bamboo trays, about 4 lbs. in a tray, which are placed in a rack, one above the other, with enough space between to permit free circulation of air and to enable the workmen to manipulate the leaves. The leaves are stirred up in these trays at intervals of from 7 to 12 mins., as required, the fermentation being regulated and kept as even as possible in this manner. Fermentation ordinarily is allowed to proceed for about 2 hrs., after which a rack of tea, about 40 lbs. of the leaf as a rule, is turned into a large circular bamboo tray and is again stirred and manipulated for 2 hrs. more, at the end of which time the edges of the leaf are somewhat dry, reddish brown in color, and with considerable of the odor of prepared tea.

FIRING PROCESS.—The leaf is then taken in lots of 4 or 5 lbs. and placed in metal firing pans over charcoal fires hot enough to wilt and curl the leaf, giving it the soft, sponge-like quality of damp tea leaves and enabling it to be rolled, this firing or wilting being accompanied by rapid stirring and tossing the leaf in each pan. The lot of tea is then turned into a round-bottomed pan fixed in the end of a bench, upon which a workman sits, and the leaf is then rolled by hand to give it something of the form of ordinary country-cured Chinese or Japanese teas. The tea is given a second pan drying, followed by another rolling, and sometimes even by a third drying and rolling, although generally two rollings suffice. This rolling is followed by a drying sufficient to get the leaf in such shape that it can be transported to the export firer. This alternate process of drying and rolling varies with the weather, and indeed the whole process depends upon the conditions surrounding the leaf. The process takes the green leaf, oxidizes or ferments it until the edges turn a reddish brown and the entire leaf is wilted; then wilts the leaf over a fire until it can be rolled to give it form, later drying it for temporary packing. This latter process often includes a light firing in a basket over a charcoal fire.

FIRING FOR EXPORT.—The tea thus prepared for temporary keeping is known as *green leaf*. It is packed in jute bags holding about half a picul, or about 66 lbs., and is transported to the export firer. The leaf thus packed is dry, but it lacks the brittle condition of the tea as it is received abroad, and generally is much lighter in color than oolong as known to the trade. When received at the firing house it is picked over by women and girls for the removal of stems, dirt, or foreign matter generally. The final firing for export is done in bamboo baskets, giving the name of *basket-fired* to the product. The firing which produces characteristic oolong is generally done in a medium-sized room in some of the great brick buildings housing the great tea establishments. In a firing room a brick platform about 20″ high is constructed, in which are round holes about 2′ deep and 2′ in diameter, ordinarily about 1′ apart, and numbering from 50 to 300 or even 400 in an establishment. In each one of these holes a charcoal fire is built and the charcoal is burned until all flame disappears, the room becoming a great furnace into which the coolies rush with covered mouths and nostrils to stir the fires and prepare the little furnaces. When finally the charcoal in each hole or furnace becomes a bed of live coals without flame, it is covered with charcoal ashes to temper the heat and preserve the fire. The entire room is still hot and is maintained in that condition for days at a time. Ordinarily it will require perhaps 12 hrs. to burn the charcoal to a proper condition and have the room at a proper temperature, the covered charcoal giving off a steady heat.

The firing is done in bamboo baskets about 3′ high and a little over 2′ in diameter, open at both ends, and with a sieve placed a little below the center as a bottom. Such a basket is placed over an open furnace or hole in the brick platform, and about 7 lbs. of the green leaf are placed in it. The leaf is practically untouched for about 3 hrs., until the quantity of leaf in the basket has become thoroughly and evenly heated naturally running through a slight wilting in becoming heated. Firers then pass from basket to basket stirring the leaf, so as to keep the drying process even and regular; ordinarily about 1 hr. between the stirrings being sufficient. It generally requires from 7 to 12 hrs. of such firing to thoroughly evaporate all moisture in the leaf, baskets generally being set in the evening and removed in the morning, the tea being boxed while warm. The firing of the tea also varies for the variety of tea desired, heavily fired teas being desirable for some markets because of the darker infusion they give.

MACHINE CURING NOT SATISFACTORY.—Machine curing of tea has been attempted in Formosa, and the Japanese Government is now supporting an experimental machine plant at Anping, Formosa. It is generally agreed by tea men, however, that the results so far have not been successful or satisfactory from any standpoint, and that the plant is run at a loss. There is no present likelihood of the machine method succeeding that of hand firing. The fact is that while, of course, oolong tea derives more or less of its meritorious qualities from the nature of the leaf itself, there is peculiar merit in the manner in which the leaf is handled and much depends upon little things which a machine can not accomplish. From this fact it may be perceived readily that any description of the process of curing these teas will necessarily be incomplete and more or less unreliable which does not represent the actual experience and work of experts, in this case Chinese workmen.

Since conditions of climate, as well as of the leaf to be cured, vary greatly, it is impossible to pass upon the matter of oxidation or fermentation satisfactorily by ascribing a certain time to a certain process, when, as a matter of actual practice it may require much more or much less time to effect such process under different conditions. Either expert workmen from China or Formosa should be employed in the United States, or American tea men should have a practical training in the processes of making teas in China or Japan, or at least should make a personal investigation of such processes. I certainly see no reason why oolong teas should not be grown and properly cured in the United States with success, since other varieties of tea are being successfully produced.

JAPANESE OFFICIAL INTERFERENCE IN PRIVATE BUSINESS

(Continued from page 36.)

the Government propose to assume the power of suspending the business of a bank, under the pretence of weeding-out the disreputable. When the improvement of the Exchanges is discussed the Government wishes to have authority to make a selection as to brokers and negotiable bonds to be regularly quoted at the Exchanges.

Judging from these and other evidences there is scarcely any doubt, continues the *Jiji*, that the Department of Finance is suffering from an acute form of the bureaucratic malady, and is bent upon extending official authority over every branch of private business, regardless of the partial stoppage of the development of commerce and industry that will inevitably result. It is possible that amongst the banks there are some which are not reputable, and the same may be true of some of the transactions on the Exchanges. The proposals of the Department of Finance to put under control the few which are the object of the proposed legislation, however, will have the inevitable effect of putting to serious inconvenience many business-men whose conduct is above reproach. Herein lies one of the injurious results of Government interference. Unless the Department of Finance rectifies this line of policy, to which it seems to have committed itself, the principal trades and industries of the country will become Government monopolies, while the economic mediums of the country will become subject to the unnecessarily severe supervision of the Government. With the extension of official power in business circles the people will be dissuaded from the promotion of enterprises, and the business and industrial world will be consequently deprived of the life and activity which is necessary for healthy growth. Moreover, it is more than likely that the example set by the Department of Finance will be eagerly followed by other Departments in enlarging their spheres of influence. Thus there will be no end to official interference in private affairs, and the expansion of administrative business.—*Japan Chronicle.*

The Fuji Paper Mill Company proposes to erect a new mill in the Hokkaido and to introduce great improvements in the existing mill at the base of Mount Fuji. The cost of these improvements is estimated at $775,000, and the cost of the new mill at $161,000. For this purpose debentures will be issued to the amount of $1,000,000, with interest at the rate of 5.7 per cent per annum, to be redeemed in fifteen years. This issue will be undertaken by the Japan Credit Mobilier (Limited). The company further proposes to increase its capital from $1,650,000 to $2,300,000.

Brick tea Factory, Mongolia:—It is reported that certain Russians have entered into partnership with some Shansi tea merchants to start a factory at Kiachta, Mongolia, for the purpose of making brick tea.

BRIGADIER GENERAL C. R. EDWARDS,
CHIEF OF BUREAU OF INSULAR AFFAIRS

GENERAL CLARENCE R. EDWARDS

The passage of the Bill promoting the Chief of the Bureau of Insular Affairs to the rank of Brigadier General is a just tribute to faithful work, and a special reward for the services rendered by Captain Edwards in his capacity as head of this important department.

The Bureau has risen to its present enviable standing in Washington through the untiring zeal and attention to detail on the part of its chief, and today it stands as the one sole bulwark of the Islands against our political enemies in Washington. The success of the various measures introduced in Congress for the betterment of conditions in the Philippines, has been due in large part to the valuable assistance rendered the Secretary of War by General Edwards and his assistant, Captain Frank L. McIntyre. To his excessive attention to our interests is traceable the malady, which at last forced General Edwards to Arizona, in the endeavor to regain his broken health.

Ice Plant, Canton:—The Canton-Hongkong Ice and Cold Storage Co. have begun the erection of their factory at Canton. The first ground was broken a few days ago, and the work will be pushed through rapidly to completion. The contract is in the hands of The Oriental Construction Co., Ltd.

Salt Works, Manchuria:—Abe Rinyemon, a merchant in Tokyo, who recently returned from a tour in Manchuria, has established the Manchuria and Korea Salt Company, with a capital of $250,000, to manufacture salt on the coast at Pitzewo and Pulantien.

New Arsenal, Tientsin:—A new arsenal is to be established at Tientsin by the Viceroy, and the representative of one of the largest German firms is there with a view to obtaining the contract for construction, which will amount to some three million Taels.

New Buildings, Tientsin:—The new building at the end of Canton and Bristowe Roads which is being erected for the Tientsin Iron Works is rapidly nearing completion.

Paper Mill, Tientsin:—It is stated that a scheme is on foot in which both foreign and Chinese capital is included to establish in Tientsin a mill for machine made paper, and that the site will be on the north side of the City.

Tientsin Waterworks Co:—The annual meeting was held on the 25th ult. The net profits for the year ended the 30th of April, including Tls. 1,012.61 brought forward from last account, amounted to Tls. 18,836.38.

Electric Power Scheme, Corea:—An application made by Baron Shibusawa and eight other Japanese capitalists for a concession for the establishment of a Company to utilize the waters of the rivers Tatong and Ham for the generation of electric power has been granted by the Corean Government. The term of the concession is twenty-four years, and the Government is to receive five per cent of the net profits.

Tokyo Street Railway Co.:—The net profit during the first half of the present year amounted to 467,370 *yen*.

Kobe Municipal Improvements:—The Kobe Municipality proposes to raise a loan of Y 1,000,000, to be utilized for the construction of a new infectious diseases hospital, a refuse destructor, the reconstruction of the city office, improvements in the drainage system, and the redemption of existing loans.

PHILIPPINE TARIFF BILL

Argument by Mr. GEO. BRONSON REA, before the Senate Committee on the Philippines.

Mr. REA. In the hearings before this committee the question involved in the proposed bill has been treated and discussed from all its view points, except one. We have listened to its elucidation from the ethical, economical, legal, constitutional, and industrial standpoints; in fact, from every phase except the most important one, and I am going to request the indulgence of the committee while I try to present the issue from the practical standpoint and show the fallacy of the other contentions and leave the real issue clear in your minds.

I think it may be taken for granted that the opposition to the passage of this bill arises from the fear of our home sugar and tobacco interests that it will seriously retard the growth and eventually swamp their own industry, and that if it could be proven to their satisfaction that such a menace does not exist they would be willing to withdraw their opposition and allow the bill to pass.

These men are undoubtedly actuated by the most honest and conscientious motives in defending their interests, and fully believe their side of the argument. The protection of our home industries is, according to their view, one of our first duties and concern, and from their standpoint their opposition seems entirely reasonable. In pleading for the cause of the Philippines and for the passage of this bill, I would like to state that as an American sugar engineer my first sympathy and friendship is with those with whom I have been connected and with whom, in the course of time, I must have further business relations. The sugar world in the United States is a relatively small one, and all new sugar enterprises invariably secure their original support from a very limited circle of capitalists, and to this same small combination the Philippines will have to turn to for the capital to exploit the industry if this bill passes.

If I honestly felt that our home interests were being menaced, and there was any possible chance of their being swamped by Philippine competition, I would not attempt to favor the bill, even though I represent Philippine interests. But I am convinced, after a most careful study of the question on the ground, that this so-called menace does not exist, and, taking into consideration the increase of cosumption in this country, the Philippine crop could never constitute a real obstacle to the development of our home industry.

The tendency of everybody interested in this legislation is to be fair and just, and to carefully weigh all the testimony presented. In the testimony before the Ways and Means Committee, in the various speeches on the floor of the House, and in the hearings before this committee it has been repeatedly asserted that this menace does not exist at the present time, but is a condition which may arise in the future. The entire question and issue deals with future conditions. The arguments brought forward to bear out these prophecies are based on many conflicting and contradictory assumptions, and, without going into these in detail, I wish to assume for the moment that these prophecies are correct. Let us grant that they are liable to come true. Now, gentlemen, if you take that viewpoint from our side of the case, it is certainly fair to ask you to take the same view of the future of the home sugar industry.

The testimony submitted by the honorable Secretary of War, Mr. De la Rama, Mr. Welborn, the governor-general, and myself, gentlemen who have been for some years in the islands and conversant with conditions there, has been opposed by the testimony submitted by Major Gove and Mr. Hathaway, who have both made a short superficial investigation of our industry, seeking for points to prove their own side of the case. Their testimony has been supplemented by statements from Mr. Humphrey and Mr. T. G. Palmer and others, none of whom have been in the islands.

Now, the undoubted head of the opposition is Mr. T. G. Palmer, who has so ably and successfully championed the cause of the beet-sugar interests here in Washington for some years as secretary of the American Beet Sugar Association. Mr. Palmer tears to pieces the statements of those who have lived in the islands, and proves his case with apparent ease and conviction. He "stands pat" on his forecast of conditions in the Philippines, and I am willing, for the sake of argument, to allow he is correct, but I also assert, gentlemen, as a matter of justice and fairness, appealing to you as a judicial body, that when we assume his infallibility on the future of Philippine conditions, which he knows only by hearsay, we must also admit his absolute infallibility in forecasting the future of the beet-sugar industry, which he is so intimately connected with as secretary of the association and chief advocate in Washington.

Now, Mr. Palmer, as the mouthpiece of the opposition, would have it that, while his predictions in regard to the Philippines must be accepted, we must reject his forecast of the beet-sugar development and the lowering of its cost of production. I do not think that this is fair. If we assume he is right in regard to the Philippines we must also assume he is right in regard to the home industry, and if we disregard his predictions in one case we must also, in fairness, reject his argument in the other. Either he is right in both cases or he is in error in both.

I think this is a fair stand for us to take in considering the merits of both sides.

Now, what do we find in the case in regard to the development of the home industry that is menaced by the passage of this bill? What does Mr. Palmer have to say about this phase of the situation? Let me call your attention particularly to that part of Mr. Palmer's pamphlet relating to the future cost of production, etc.

I would like to quote from page 292 of the record and have it incorporated in my statement, simply as referring to the ultimate cost that Mr. Palmer prophesies at 2 cents a pound:

> I take it that further Philippine tariff reduction is likely to come in due course of time, but it should not come until the Philippines greatly raise their wage rate on sugar haciendas and become at least semicivilized, and until the brains and capital already engaged in the home industry, and which will come to it under favorable circumstances, if let alone, enable us to perfect the various improvements now under way.
>
> Two years ago I wrote you at length concerning my suggestions of producing single-germ beet seed. The work was begun immediately by the Government, and the first crop of seed from beets grown from 2,500 selected single-germ beet balls has just been harvested. I understand that 30 per cent of this seed came single germ, and the expectation is that in four to six years more it will be an established thing, saving the farmers $6 per acre of actual labor, eliminating the hand work of thinning on hands and knees, and at least doubling the tonnage per acre on account of no injury being done to the remaining beets by hoeing out the superfluous ones, each plant standing 1 to 3 inches apart, depending upon how closely the seed is drilled in. If the sugar beets which the farmer now sells to the factory at an average price of $5 per ton cost him $3.50 per ton to produce, his crop grown from single-germ beet balls should not cost him to exceed $1.50 a ton.
>
> The Government has taken charge of the scientific work on one of our sugar-beet seed farms in the State of Washington, and expects to be able to produce a strain of seed as high in sugar content as the best beets selected at the outset, which is 25 to 28 per cent. These mother beets should give factory beets of 23 per cent sugar, and, with a loss in extraction of 3 per cent, would enable the factory to turn out 400 pounds of granulated sugar per ton of beets. According to the Government report on the home-sugar industry for 1902, the average amount of sugar extracted per ton of beets was 221 pounds; hence this anticipated extra production of 170 pounds would nearly cut in two the present factory cost of producing sugar from American grown beets.
>
> Doctor Wiley, chief of the Bureau of Chemistry, Department of Agriculture, is to experiment this coming month with sugar "concrete," and, if successful, each factory, by increasing its investment 25 per cent, can operate three near-by "concrete" plants, shipping in the "concrete" to the main factory after the local campaign has been concluded and thus operating the year through and quadrupling its product, which would greatly lessen the cost of production.
>
> Experiments are being made this year with an invention designed to remove the impurities of the juice at the outset instead of from the waste molasses after coming down through all the various processes, the inventor claiming that it will reduce the cost of a beet-sugar plant by 50 per cent, the labor to operate it by 33⅓ per cent, yield an average excess of 20 pounds of sugar per ton of beets, besides saving several valuable by-products.
>
> All these matters lead to an eventual cost of production of granulated sugar from American grown beets of something like 2 cents per pound, but it takes not only money and brains to perfect these improvements, but it takes time.

Now, I contend that this point is the most important and significant that has been brought out before these hearings, and too much stress can not be laid on it. Either Mr. Palmer knew what he was talking about or he was intentionally misrepresenting the situation for certain ends. In either case his statements should be carefully weighed by this committee, for in that statement he has fully answered his own case, and conclusively discredits all his predictions about the Philippine menace.

If we accept Mr. Palmer's present intimation that he made an error when he wrote that pamphlet, or his repudiation as an expert by his Michigan brethren, and assume his predictions can not be fulfilled for some years at least, then, gentlemen, I think, in all fairness, that you can safely decide against the opposition to the bill.

If he was right in his statement, then there is nothing to fear, and if he was wrong, then we may assume that it was written with the express purpose of representing the situation to foment opposition to this bill.

The object of that pamphlet was to awaken the beet-sugar interests to a realization of the supposed menace implied by this bill, to quicken their interest in the legislation in Washington, and to force them into action to defeat it. The pamphlet deals with the situation from their biased viewpoint, attacking the motives of the Administration in regard to the islands; questioning the integrity of the honorable Secretary of War; characterizing the friends of the measure as exploiters and bad friends of the Filipinos; grossly exaggerating the situation in the islands, and then, to further awaken their interest, he appeals to their cupidity and dwells on the golden outlook for the home industry, specifying in so many words the number of years in which they may reasonably expect to make their sugar inside the tariff wall for 2 cents a pound. He then holds out the threat of the "big stick," which will be employed to force our legislators to do their bidding, and finally concludes with an earnest appeal to all those interested in the industry to write letters to the President, Vice-President, Senators, Members of Congress, and the leading "stand-patters."

The pamphlet has accomplished its work; alarmed at the menace so skillfully painted by Mr. Palmer, and enthused by the brilliant forecast offered for their own industry, the prospect of making sugar at the lowest price the world has ever seen, is it any wonder that a great sentiment has been created in opposition to the bill and letters from all over the country have poured into Washington in response to Mr. Palmer's suggestion? How many Congressmen and Senators have received these letters, influencing their attitude against this bill?

Now, gentlemen, we must acknowledge that this great sentiment in opposition and the receipt of all these letters is a direct outcome of Mr. Palmer's appeal to his constituents and should receive the consideration of our legislators accordingly.

But if we now accept Mr. Palmer's statement that his glowing prediction as to the future of the beet-sugar industry was based on his imagination, then we find that he has misrepresented the case to his constituents, and therefore the sentiment created against the islands was the result of such misrepresentation, and the letters to Congressmen, Senators, and public men were also influenced by these misrepresentations and in due justice and fairness to all concerned should be rejected as not having any material bearing on the case.

But I have taken the stand, for the sake of argument, that this menace will come, and in allowing this I have also contended that in fairness we assume the correctness of the beet-sugar future.

Suppose that capital was waiting for this bill to pass to invest in sugar lands in the Philippines, how long would it take before the first crop could be taken off? Exactly three years. Now it is undisputed that no capital is obtainable in the Philippines for the development of the sugar industry. The banks refuse to advance money on the security of the lands. This is the only security the native planter has to offer for a loan, and the money lenders refuse to advance on it, for in the event of foreclosure the loan can not be realized by the sale of the lands. Most of the plantations are already mortgaged to the limit and have not paid the interest for years. Instead of foreclosing those mortgages, the money lenders find it more profitable, though more hazardous, to make further loans at a higher rate of interest on the crop. These high rates of interest are not understood here, and the impression is that the planter is being robbed, yet the system is based on good sound business principles. If the lands have no value or can not be sold to advantage when foreclosed, a mortgage on them is worth little, and when money is advanced on the crop it is simply a gamble. The money lender, on advancing a large amount for planting and crop purposes, has absolutely no guarantee except the good faith of the borrower, for if dishonest he can divert the money into other channels—which is often the case—in gambling and high living and only a small proportion goes into the enterprise. If the season is good and prices high, a profit may accrue from the crop, but there are even chances for the reverse.

Now it can readily be understood that under such conditions there is little hope of the native planter securing any large amount of capital to improve his place. On the installation of modern machinery hinges the question of whether the present crop will increase. It has been asserted by the opposition that on the passage of this bill the mills in the Philippines will, by the installation of modern methods, double their output in sugar in a couple of years, and while the fundamental fact is feasible in some localities I wish to prove that the present establishment can never hope to develop along these lines and that any great increase in our crop must come from the investment of outside capital.

The average plantation in the islands is so small that the owner could not, with his holdings, accomplish anything by a modern equipment, as the limited land area and size of crops is not capable of keeping one going, and his inability to secure money in the local market is another deterrent factor.

Let me cite you an instance of a fairly modern equipment installed in the islands. On the estate of Mr. Lacson, near Bacolod, in Negros, is installed the following machinery: One 80-horsepower 6-foot mill capable of grinding about 25 tons of cane per hour, two large open-kettle trains, and several centrifugals.

This is the most modern equipment in the islands, yet with his cane acreage of some 200 to 300 acres, the scarcity of help and work animals, they could not keep the mill going for more than one hour or so at a time, finally abandoning this plant and now grinding the cane in a little water-power mill in another corner of the estate.

So it is quite impracticable to expect that any of the present plantations will be able to develop their properties to the extent of increasing their yield, first from lack of capital and inability to secure it, and secondly, from the limited acreage, which makes it unprofitable.

I must also add that the present factories and mills with their equipments are all so old as to be almost worthless as an asset, and have no value except as old iron, and in changing the house around for a modern equipment everything would have to be thrown away and a new house erected. There is not a factory in the islands that admits of being improved or new machinery added to bring it up to modern practice. Not one piece of machinery now employed could be utilized in doubling or improving the output. There is not a mill house or structure in the islands capable of holding such improvements, and so we can readily see that entirely new plants will have to be erected and installed and operated on a central factory basis before any great increase in the crop will occur.

The central factory scheme is the only solution to existing conditions, and to secure this we are absolutely dependent on outside help and capital. The installation of such factories is a question of time and patience. It is not an easy matter to secure the right conditions to make such a venture profitable. In the first place we have to assume that the capital is ready to embark in the enterprise; then comes the question of assuring its continuance as a profitable investment. A central factory need not own any land, but simply confine its operations to the manufacture of the sugar from the cane, paying for the raw product at so much per ton, a percentage in sugar on the weight of the cane, or by the percentage of sugar in the cane. A fair-sized factory would cost, with the necessary land, railways, and rights of way, from $300,000 to $500,000, or to $1,000,000, according to its capacity. Before any attempt can be made to consider the matter seriously certain guaranteed contracts with the farmers for the supply of cane for a number of years have to be secured. The farmer is guaranteed that his cane will be ground by the erection of the mill, but the mill owners must have the guaranty that the cane will be forthcoming before the factory is erected, and the only guaranty worth anything under such conditions is a mortgage of the lands.

In dealing with a race naturally suspicious and distrustful as the Filipinos this guaranty is difficult to secure, and experience has proved that it will be uphill work to make a start. One of the ablest sugar men of the Hawaiian Islands spent some months in the Philippines trying to secure the necessary guaranties for the delivery of cane, preparatory to the erection of a central factory, but had to finally abandon his labors, as he could not overcome the distrustfulness of the natives. The development of the central factory system, as in Cuba, is a slow process, and only comes with perfect understanding and confidence between all parties. For years they have been agitating this question in the British West Indies as the only hope of saving the decadent sugar industry, but as yet no actual headway has been made, as the average planter is unwilling to lose his identity as such and be relegated to the farmer class, preferring rather to struggle along with his old one-horse outfit making muscovado sugar than to enter into an arrangement which loses for him his former status of planter in the community. In a country where for centuries this class has lorded it over the natives, modern ideas of combinations are slow to take root, and it is especially true in the Philippines.

In Cuba the great central-factory system is the gradual outcome of years of development and competition between the planters, and of the two hundred or more centrals now in operation, not more than a dozen were originally built as such.

So, while the erection of central factories in the Philippines is the one hope of infusing new life in the industry, it will be readily seen that this desired end is surrounded with many difficulties, and the capital must be forthcoming from the outside. American capital will be slow in going to the islands, even with the inducements offered by free trade, for its great distance from our financial centers is an obstacle in getting investors to look over the field. To the assertion of the opposition that capital will flow into the islands on the passage of the bill, I would like to respond with the query, how much capital has flowed into Porto Rico since free trade was granted? Even with the most alluring prospects of free trade, good soils, and abundant and cheap labor it is a fact that only two large American central factories have been established there—the Central Aguirre and the Guanica Central.

Just previous to my departure for the Philippines I spent four months in Porto Rico securing the necessary contracts and options for the establishment of a central factory in the most fertile and favorable district of the islands, or between Naguabo and Humacao, yet it was an impossibility to float the company in New York at the time, and it has taken two years to get the necessary capital together to make the venture a success and erect the factory. To make good the prediction of our friends of the opposition as regards the islands means that the farmers are anxiously awaiting the central factory promoter, and that millions of dollars are ready to go into the country, when as a matter of fact the opposite obtains.

In connection with this phase of the situation I would like to refer briefly to Senator Newlands's proposition to establish a Government agricultural bank as a means of building up the sugar industry and placing it in a position to lower the cost of production and compete with the world's price of sugar. This scheme, which would be practical when dealing with minor agricultural crops, fails when applied to the sugar industry of the islands in its present condition. If the industry was further advanced and the mills in shape to be enlarged, and of sufficient value to serve as an asset, the scheme would work out, but with the most rudimentary methods and machinery, which would have to be discarded at the outset of the development, the plan is not a safe one. As I have already stated, there are few plantations with sufficient acreage to warrant the installation of such machinery. These holdings, averaging, say 500 acres, though the real average is only 136 acres in cultivation, are sufficiently large for a little 8-horse-power primitive outfit, making a crop of, say 200 to 300 tons, and giving a fair living to the owner. The value of the lands at an average of ₱40 per acre would be ₱20,000, but no bank or money lender is willing to risk a loan exceeding, at the very utmost, one-quarter of this, so it is plain to be seen that with the creation of such a bank it would be impossible to loan out at good security sufficient money to install any modern machinery that would greatly increase the yield of sugar over the old process. Five thousand pesos is not a large amount for machinery; it wouldn't be enough for the foundations.

Such a bank might take up the bonds of a central factory company, thus insuring the necessary capital, but even here the mortgage depends on the assets of the company, as to lands, contracts, options, etc. The apparent success of such an institution in helping the sugar industry would be in loaning out money to the small farmers, etc., contracting with the central factory, but here we again strike the difficulty that they have to take a second mortgage, as the first is given to the central factory company as a guarantee for the delivery of the cane, and the rule in Cuba and elsewhere in this system is that the central factory must also assume the functions of an agricultural bank., loaning out money to the farmer to plant, cultivate, and harvest his crop. To be successful a bank would have to maintain an elaborate system of inspectors to see that their loans were really expended in the fields, while the custom under a central factory is to facilitate certain sums to the planters after the work is concluded, to be repaid during the crop at usual rate of interest.

As the factory has the guaranteed contract for the delivery of the cane to itself, it is doubly secured and simply deducts the value in sugar at the expiration of the crop season.

So with the creation of a central factory system, the operations of an agricultural bank, would be practically rendered useless, as instanced in Cuba. The bank can not guarantee or insure the establishment of the factory system, which is necessary to the real development of the industry, and under existing tariff conditions capital will not embark in the factories, and only under the provisions of this bill can we hope to induce the necessary capital to enter the islands. This system, of course, is only applicable to the lands in Negros, where there are sufficient planters to insure its success.

In the other islands, where there are no plantations at present, or where cane is grown in small patches, any great development of the industry must depend on the erection of large plants and the company also own their own acreage and cultivate its own cane. This condition is one beset with difficulties at the very outset, for the land law which limits the holdings of a corporation to 2,500 acres is a serious obstacle to the successful floating of a company. A fair-sized modern mill of to-day should have a capacity of 10,000 tons of sugar. To secure this result it would be necessary to hold 5,000 acres in cane lands, 1,000 acres in pastures, 1,500 acres in railway lines, timber, etc., and as the lands become exhausted, new lands have to be purchased to keep up the normal capacity of the mill, or, in brief, it would need something like 7,500 acres of available land to insure a crop of 10,000 tons of sugar.

Right here I may say that it is impossible to secure a continuous acreage of 7,500 or 10,000 acres, all of which could be available for cultivation without including several thousand acres of waste lands, such as hills, rocky lands, swamps, etc., which could not be placed under cultivation, but which would have to be purchased to secure the other acreage, thus raising the average considerably. Mr. White, of Hawaii, who recently spent some months in the Philippines studying our lands, gave it as his opinion that no Hawaiian capital would invest unless 25,000 acres at least could be controlled by the factory.

The present land limit of 2,500 acres practically confines an enterprise to 3,000 tons, or only 1,500 acres in cane, as it will require 500 acres in pasture and the balance in timber, roads, etc. This is also assuming that a crop is produced once a year, while as a matter of fact, under present conditions on the older lands, a crop is secured only once in every two years, which decreases the limit of such a holding to a crop of 1,500 tons and the necessary limit for a large company to 12,500 acres. Under such conditions it is folly to assume that capitalists will be attracted to the islands, for a modern mill, to be operated economically and secure the maximum results, must have a large capacity and the most powerful mills and apparatus.

There is another feature to this phase of the question. It is an accepted fact that it is difficult to get the Filipino to move away from his natal province, and any attempt to foment the sugar industry on the islands of Mindoro, Mindanao, or Samar would be checked at the outset by the difficulty of securing labor. It is also conceded that those islands are the most promising of the archipelago, but for the above reason they must be eliminated as a field of development for the present generation at least.

I think that rather answers the statement that was brought out here the other day about this vast track in Mindoro. It may be there, but, gentlemen, I assure you it will be there fifty years from now, uncultivated. There is no labor there, and it is very difficult to get it there.

Another great difficulty to the successful floating of a large sugar company is the absolute lack of experienced and skilled mechanics and labor in the islands. Every employee, aside from the unskilled labor, would have to be imported, and under our laws this means they would have to come from the United States, or, in other words, from Hawaii, Louisiana, or Porto Rico. Managers, assistant managers, engineers, chemists, sugar boilers, defecator and triple-effect men, locomotive drivers, field superintendents, and others would have to be supplied from outside the islands, as there are none there to fill the billets.

We have not a single skilled mechanic or trained man in the islands that we could put to work in a modern factory to-day, not even an engineer. There is not one who knows how to set a mill knife.

This means that they would all have to be employed under contract at a higher scale of salary, and their expenses both ways guaranteed, raising the rate at least 25 to 50 per cent over current wages. We have to do this, as it is done in sending sugar-house employees to Cuba, Porto Rico, Santo Domingo, Mexico, etc., and it would also pertain to the islands. Now, skilled sugar men are scarce and difficult to secure and command large salaries, and anyone who contemplates investing in the islands must confront this at the outset. There would be no difficulty in securing the necessary men for a few factories, but it would be out of the question to supply any great number without offering such great inducements as would considerably raise the cost of production.

All these are serious obstacles to the rapid development of the sugar industry in the islands, as viewed from the inside by a competent and experienced expert in the trade of the Philippines. Still assuming that Mr. Palmer's forecast is correct and viewing the situation from the stand of the capitalist, we find as Mr. Palmer contends:

> We can offer the Philippine Islands a perpetual market for nearly $200,000,000 worth of purely tropical products annually. But whatever magnitude their sugar industry may reach, those who put their money into it will some day be compelled to fight a battle royal with the educated, scientific American farmer which will be costly for both and ruinous for one. Never in the history of the world has the nervous energy of the Temperate Zone succumbed to the listless workers of the Tropics, and it remains to be seen whether or not the sugar industry is to furnish the exception.

Mr. Palmer's roseate presentation of the home industry, and its future cost of production, the cheapest the world has ever seen, is always to be kept in mind. When anyone contemplates an investment in the Philippines his first impulse will be to read the testimony submitted here in Washington by those who should know what they are talking about, and, if my judgment is worth anything, he will be so utterly bewildered and disgusted that he will abandon his idea immediately, or if he reads enough he will find and Mr. Palmer's prophecy as to the home industry, and the prospect of that battle royal with the educated scientific American farmer against the listless workers of the Tropics will decide the matter for him. Does anyone believe that capital is going to rush into the Philippines any faster than it rushed into other sugar-producing countries, and in face of the possible competition of the American beet industry making sugar at 2 cents a pound? Gentlemen, Mr. Palmer has fully answered himself and his attacks on this bill, and any fair-minded party can see the absurdity of his contentions against the islands. In this case his Philippine producers are best treated by the application of the homeopathic remedy. "Similia similibus curantur" like cures like or a piece of the hair of the dog that bit you, and the ailment melts away. With beet sugar at 2 cents, it means that the good Lord would have to repeat the old miracle of sending down sugar, instead of manna, each morning for the Filipino to collect and ship to this market, and after he has given up .60 freight, .03 insurance, $1 to the refiner, and 49 cents freight to the Missouri River, it looks as though he would have to get another special dispensation from the Almighty to secure the 20 odd cents to bring to the storage and commission houses.

The operation of the land law, which prohibits the creation of any large holding and manufacturing enterprise, is also an obstacle to the successful development of the central factory system. The factory could get a good start, and might never come into conflict with the provisions of the law, but the chances are that after a few years have elapsed it would become necessary to take over the lands of delinquent planters or to acquire their own acreage. It works out in practice that where a central factory commences operations with only the necessary acreage for the mill and yard site, in a few years it absorbs the surrounding properties, either by foreclosure or purchase. This is especially true where a competing factory is in the same territory, for then after the original contracts with the farmers have lapsed the factories are at their mercy, as exemplified in Cuba, and the only method to assure a supply of raw material at a reasonable price is for the factory to plant or control its own acreage.

These are apparently small points, but they assume great importance in estimating the future of such an enterprise, and unless the adverse eventualities are reduced to a minimum no capitalist will risk his money in it.

Now, the fear of the opposition in regard to the future of the Philippine sugar industry as an outcome of this bill is not based so much on the possible tonnage or acreage as on the future cost of production, for it is clear that, granting there are lands sufficient in the islands to produce all the sugar consumed in this country, what possible menace could occur, unless the cost of production was lower than that in the United States or other countries, or so low as to undersell the home product? That is the point at issue, and the opposition has repeatedly shied at it and confined their arguments and testimony toward accentuating the great possibilities of the acreage, which is really a secondary consideration. I have never given this argument serious thought, nor would any other practical man desirous of being fair and impartial, for as to the available acreage, it has been amply brought out by Mr. Wellborn that there are sufficient alluvial lands in the State of Louisiana to supply the country with sugar, and the same statement has been made by Mr. Wagner in regard to the lands of Wisconsin, and it is also true of other parts of our country, and the contention is therefore one having no direct bearing on the case, and only advanced by the opposition to befog the issue and create erroneous conclusions.

The yield of the lands in cane is also another phase of the question having an important bearing on the final merits of the case, and the length of time required to secure a crop, and in making comparisons for the purpose of defeating the bill they should be fair and just, taking all conditions under consideration, and not jumping to extremes, as has been the case.

All we ask is that when making comparisons they remain fair, and not take the most favorable conditions of all the countries in the world and attribute them to the Philippines, and if they will do that we will rest our case in confidence before any body of impartial men. Now, as I have pointed out before the Ways and Means Committee, the comparison with Hawaii reveals a determined attempt to disregard normal conditions, and place our case in parallel with the abnormal, and without the benefit of the qualifying conditions. It is an acknowledged fact that some lands in the Hawaiian Islands secure the phenomenal yields of 10 to 12 tons of sugar per acre, while other lands in the same islands cultivated under normal conditions without irrigation, yield the world's average of 2 tons to the acre, yet to strengthen a certain line of argument detrimental to the Philippines the exaggerated yield of 12 tons is taken as the fair basis of comparison. I hold this is not only unfair, but unjust, and such tactics unworthy of broad-minded people.

It is also a fact that the sugar lands of the island of Oahu and other points producing large yields necessitate a proportionate increase in the cost of production, and it is also a fact that lands in the Hilo district of the island of Hawaii, producing cane under natural conditions without irrigation and averaging 25 tons to the acre, are just as profitable as the lands with the exaggerated crops, and the proportionate cost of production must be the same.

Any great increase or abnormal yield of cane on ordinary lands forcing the growth and richness must necessarily operate under the natural law of diminishing returns. The point is soon reached where the results secured are not commensurate with the outlay of cost. It has been amply proven in Hawaii that under natural conditions of soil and rainfall an acre of tropical land will yield the world's average of 20 tons of cane or 2 tons of sugar. I wish to incorporate in this testimony right here the official figures relating to the Hawaiian crops, as given by the planters' association there, for the last two years, which bear out my statement.

Yields by islands.

Year.	Acres.	Sugar. Tons.	Yield per acre. Pounds.
OAHU.			
1904................	15,832.00	102,019.78	12,888
1905................	18,782.84	123,094.76	13,107
KAUAI.			
1904................	14,959.15	64,603 47	8,637
1905................	16,541.82	76,313 42	9,227
MAUI.			
1904................	13,948.80	77,926 00	11,173
1905................	15,116.46	100,433.57	13,288
HAWAII.			
1904................	47,057.67	122,855.54	5,281
1905................	45,002.39	127,523.73	5,667

Yields of sugar for the Territory of Hawaii, crops of 1904 and 1905.

Year.	Acres.	Sugar. Tons.	Yield per acre. Pounds.
TOTAL YIELDS.			
1904................	91,797.66	367,405.07	8,005
1905................	95,443.51	427,365.68	8,955
IRRIGATED PLANTATIONS.			
1904................	42,809.99	239,987.91	11,212
1905................	48,668.12	295,797.99	12,156
UNIRRIGATED PLANTATIONS.			
1904................	48,987.67	127,417.16	5,202
1905................	46,775.39	131,567.69	5,625

The total tonnage shown in this statement is a little at variance with the figures printed in the crop returns, but this variance is accounted for by the fact that the plantations in reporting their tonnage to the Experiment Station, return the total amount produced for the crop, while in reporting to the secretary of the association they return the amount produced for the year ending September 30, 1905.

This gives the yield by islands. The average yield of all the islands was 4 tons to the acre. The average yield on irrigated plantations was 6 tons to the acre, and the average yield on unirrigated plantations under natural conditions was a little over 2 tons to the acre.

Any increase in yields over the normal must be obtained through increased expenditures. The ground may be plowed deeper, but every inch of depth represents that much additional time, energy, and capital expended, more horses, mules, or oxen are necessary for the power equivalent, and different and larger plows for the mechanical end. On the island of Hawaii, with their ordinary yields, the plowing is performed by mules. If we want the maximum depth of say 15 inches in plowing, we must eliminate the animal power and turn our capital into powerful steam plows. It is apparent an increased yield will result, but at the increased cost. This is what is done in the other islands of the group. If we further add the expense of fertilizing, and irrigate the lands, the results are again increased, and if, as is the case in many of the large plantations in Hawaii, immense pumping plants have to be installed to lift the water from deep wells and deliver it to high elevations against enormous heads the costs increase by leaps, and the point soon reached where further outlay is not justified by the returns, and as they are increased beyond this point the returns diminish. This is exactly what has occurred in the Hawaiian Islands, where the system has been forced on the planters, owing to the limited area of the lands, which forces them to creep up the mountain side, as there are no available lands in the valleys.

Now I am going to incorporate again right here the report of the manager of Ewa plantation, proving that I am right in the assertion that it costs as much in proportion to secure these phenomenal returns as it does to secure the same returns from an estate operating under normal conditions.

On page 1340 of this monograph on sugar, published by the Treasury Department, it gives in Mr. Saylor's report of the Hawaiian sugar industry, the report of the Ewa plantation. I will just read it:

Expenses per ton of sugar grown and per acre

	Per ton.	Per acre.
Clearing..........................	$ 0 54	$ 5.51
Mule and steam plowing	1 41	14.50
Ditches..........................	.20	2 05
Cutting and hauling seed.........	.80	8 22
Preparing and planting.........	.88	9 04
Fertilizing.......................	4.01	41 13
Watering.........................	3 63	37.18
Hoeing and weeding..............	.76	7.85
Stripping.........................	1.49	15.25
Cutting and hauling cane........	3.41	35.62
Pumping expenses................	2.42	22.84
Sundry accounts, rent, interest, and all other expenses........	5.33	54.63
Manufacture......................	2 65	27.15
Containers.......................	.99	9.77
Total cost..................	28.59	292.74

That $28.59 was in 1897, when they had contract coolie labor.

I might state that the present costs of the Ewa plantation are $38 per ton at the mill, and the additional selling costs, interests, etc., bring the total up to $50, and the average costs of the islands are somewhere between $45 and $50, or 2¼ to 2½ cents per pound. The testimony of Mr. Hatch, representing the islands, states that notwithstanding these immense yields the average returns on the aggregate capitalization are from 2¾ to 3 per cent. A good many places paid nothing, others as high as 12 to 18 per cent, and where previous to annexation the industry was profitable, the increase of wages, etc., since has greatly increased the costs and reduced the profits.

It will be seen that, although the lands return such a great tonnage, the cost of producing the ton of sugar is approximately the same as the world's average of $40; and, furthermore, despite the apparent phenomenal showing made in the average yield of the islands of 4 tons to the acre, owing to the cane being in the ground for eighteen months, it is really the same as the world's average crop of 2½ tons grown in other tropical countries every twelve months. So on analysis it is seen that the islands do not escape from the equalizing laws of nature, and when we apply the comparison to the Philippines it does not hold water, for it is folly to assume that this system will be employed there, where the land area is ample, and where, under ordinary natural conditions, the lands will produce the same profits to the planter as the forced, highly cultivated, and expensive lands and hillsides of Hawaii. This is simply common sense.

The limit of abnormal development has been reached in Hawaii, and the law of diminishing returns is now in operation. The situation is at present occupying the constant study of the planters' association, through high-salaried soil experts, to devise means to lower the cost, and the last annual meeting of the association was given up almost wholly to a discussion of this topic, as being the most important confronting the life of the industry.

Now, gentlemen, I think that with this elucidation of the subject I have conclusively established the point that as far as the Philippines are concerned we can eliminate from our minds the possibility of ever producing any phenomenal yields like Hawaii, and we are now free to get down to a more rational basis and take a practical, fair-minded view of our possibilities.

Now, the point under consideration is the possible cost of production under a reduction of the tariff as embodied in this bill, and whether it will prove a menace to the home industries and drive them out of business. I have come here to-day to be fair and impartial and meet the opposition on their own grounds, and admit many of their contentions solely for the sake of argument, and show them they are in error. Right here I will admit, for the sake of the argument, that the Philippines may under given conditions produce the same yields as Hawaii, and operate up-to-date factories. Now that fairly meets them on their own ground of exaggeration in this instance, with perhaps the difference in wages that exist at present. Now the Hawaiian Islands were annexed in 1898, and came under the operation of our exclusion, contract labor, and immigration laws. Previous to that they employed cheap contract coolie labor, paying about the same as is paid in the Philippines to-day. Now if you will look over the estimate of cost submitted by Mr. Renton of the Ewa plantation to Mr. Saylor, you will see that it bears the date of 1897, and that the cost per ton was $28.59, or approximately 0.015 cent per pounds.

Now in these comparisons, I expect reciprocity, and when we admit the predictions of the opposition as to the islands, we must also admit their own predictions concerning their own industry, and we find that the final report of the Senate Industrial Commission in 1900 fixed the cost of beet sugar at 3 cents. Mr. Saylor states that they were making it at 3 cents in 1900, and other witnesses have admitted the cost at 3½, while Mr. Palmer holds that the future has a 2-cent golden lining to it.

If we are to be compared to Hawaii (and that is the most exaggerated yield per acre that the opposition has taken), and we find that under similar conditions of manufacture, labor, intensive cultivation, and phenomenal yields that we are going to make sugar at 1½ cents, the same as the Ewa before annexation, we have the following costs laid down at the competing district of the Missouri River: Cost at Iloilo, 1.50; freight to New York, 0.30, insurance, 0.0225; duty, 0.42, storage, lighterage, etc. (⅛ cent). 0.125; shrinkage, 2 per cent, 0.03; commission on sales, 2 per cent on 3.50, 0.07; difference between refined and raw, as maintained by the refiners, 1.00; freight from New York to Chicago, 0.24 cents, and from Chicago to Omaha, 25 cents (see Mr. Palmer's testimony on page 593), or 0.49 cents to Missouri River, or a total of 3.9575.

I will make a reduction from $3.95; take off 20 cents and that brings it down to $3.75, before it comes into competition with the refined product of the West, which is now produced at 3½ to 4, next year, according to Mr. Collins, will be reduced to 3, and by the time the Philippines reach any stage of development Mr. Palmer's prophecy will be fulfilled, and the Philippine sugars will never reach there, or by that time the same increase of costs will have prevailed in the islands as have in Hawaii, and the cost at Iloilo will have ascended to the Hawaiian average of 45.00 to 50.00, increasing the cost at the Missouri River to such an extent that competition will be out of the question.

I have only made that comparison with Hawaii to offset the comparison that the beet-sugar people have brought up here about our possible yield, and to show that even under such enormous yields the cost of production would be the same; that we could not lay it down at the Missouri River for less than $3.90. In all this controversy the opposition have deliberately disregarded and ignored well-known facts and conditions, and not content with distorting the facts in comparing the future yield of the Philippines with the excessive product of Hawaiian lands, they further advance the argument and state in effect that the Philippine lands are so fertile that they outrival those of Cuba, and in addition to giving 12 tons of sugar to the acre, they will rattoon for fifteen to twenty years without replanting. They compare us with

Hawaii because that country holds the world's record for yields, and they compare us with Cuba because that island holds the world's record for rattoon crops, and then with Java because that island holds the record for low wages; but they forget to qualify other conditions in these countries which equalizes the differences and in the end places them all on a common basis; for in Hawaii, with the banner yield and the lands forced to the limit of modern cultivation, they can only secure two rattoon crops, and these every eighteen months; and Cuba, where the cane grows like a weed for fifteen years, decreases the yield in proportion, and new virgin lands giving 4 tons to the acre dwindle down to about 1½ tons in the course of a few years; and in Java, where the yield is constant at 4 tons, it is because they plant every year. So it would appear on accepting their side of the argument that the Philippines are destined to produce 120 tons to the acre for fifteen years without replanting and at a labor cost of 10 cents. Of course, they are correct on their final deduction that the cost will be so low that we can place 96° sugars on the New York market for a cent a pound, but, gentlemen, this is the limit of exaggeration, and man's unfairness can go no further.

Mr. Hathaway, who spent some time in the islands securing data to defeat this bill, points out that the cane rattoons for many years, but I pointed out in the hearings before the Ways and Means Committee, from my experience as a cane-sugar engineer, that under the system of cultivation practiced in the islands it is absolutely impossible to secure such rattoon crops, on account of the distance between rows and seed being too small to allow of the development and nourishment of the roots, and I still maintain that my explanation is correct, and until the native changes his methods a successful rattoon crop is impossible; and this will always be impossible for the present planters, as they have not the land area sufficient to double the distance between the rows and secure a yield in proportion to the additional costs involved in plowing, cultivating, etc. I am unwilling to go on record as stating that the islands can ever produce any more than two profitable rattoon crops, which is now secured in some new lands removed from the coast, but under present conditions the high costs of transportation overshadow any benefits accruing to the planter from such crops, but I am not narrow, nor do I wish to cling tenaciously to my view of the case, but am willing, for the sake of argument, to meet the opposition half way and allow that we might in the future secure four such crops, and for the same sake of argument I am willing to allow a slight increase in the tonnage for the first year, but in being fair I will not accept any exaggerated figures, and if we assume several rattoon crops we must also change our comparison and leave Hawaii out of the question and look for a similar field, working under analogous conditions, as to yields and labor wages, and ascertain the equivalent costs of production on which this entire question depends. Not the present cost, but the cost under a modern system of manufacture and transportation, and with a scale of wages equivalent to what now obtains.

I have fairly challenged the opposition to produce for the benefit of this committee a detailed statement of cost of production which will bring the Philippine product down to less than one cent, and they have had ample time to do so. But they have refused to accept a fair challenge, and instead confine their replies to generalities, suppositions, guesswork, and broad unqualified statements that they are unable to prove or substantiate with reasonable data. What we want here are facts.

In the Ways and Means Committee I tried in a brief manner to make clear what the future cost of production would be in the islands under modern methods, and compared the cost with Java to show that there could never be any menace to the home industry, but as Java produces no rattoon crops, and as I have for the sole sake of argument admitted that the islands might, under certain conditions, produce four, I must take for my comparison a country laboring under the same conditions. I would take Cuba, but the comparison would be too strained, as that country stands in a class by itself as regards rattoons, so I can fairly turn to Porto Rico. This comparison is a good one, as the island is small in area, like the average one in the Philippine Archipelago, with the same general geological characteristics, mountainous in the center, and only suitable for cane culture in the accessible valleys running to the coast; no railways, no ports where steamers can dock; the same type of labor, lazy, shiftless, and anæmic; the same low scale of wages, and for the sake of the argument the same fertility of soil, surcharged with clay. Now, what do we find is the case in Porto Rico under these conditions? I am not going to inflict my private views in regard to this, but will quote from the report of Mr. Charles F. Saylor, a special agent and expert of the United States Department of Agriculture, who visited the islands in 1898 to study the situation.

Now, we find in Mr. Saylor's report, by following these comparisons, that they are exactly the same as obtain in the Philippine Islands, even as to the type of labor, their wages, their food, the yield per acre, and the machinery that would be employed under modern methods of manufacture. You will see what the result will be. I will read only short extracts that bear on these particular points. Speaking of the food rations he says:

> In this connection it may be worth while to mention the food rations of the people, as it has a bearing on their industries. The results to be attained by labor, whether animal or human, can be largely estimated from the food consumed. It would be as unreasonable to expect good results from either on limited, poor, and sometimes innutritious food as to expect a maximum of energy from a steam engine supplied with a poor kind of fuel.
>
> I investigated the wage scale of the sugar, tobacco, and coffee industries, and these are the chief ones of the island These industries are much alike in their labor requirements. A great many boys from 10 to 15 years of age are employed. They get from 15 to 30 cents a day Spanish money, or from 9 to 18 cents American money. The unskilled adult laborer receives from 35 to 63 cents, or an average over the island of 50 cents a day Spanish money. This equals 30 cents American money. Bosses of gangs in the factory or in the fields get $1 Spanish money. Bricklayers, carpenters, plumbers, and other skilled workmen get the same. Of course, in the factories there are required a few skilled men, such as "boilers," who get $50 per month (gold).

Exactly the same as the Philippine Islands; the comparison could not be better. Then he goes on to say that he only found two modern factories in the island of Porto Rico, one of them the Central de Canovanas, which belonged to the Colonial Sugar Company, an English company, which is operated in the most thorough, up-to-date manner, and where they keep complete records and data about the yield of cane, the extraction, and the effectiveness of the processes employed. In regard to the cane on this place, he says:

> I found that the number of crops cut from one planting ranges from one to eleven, that being the highest reported. In a majority of cases the number of cuttings from one planting is three or four.

Now that is the limit that I have assumed that may come in the Philippines, taking the opposition at their word.

Then he goes on to say what the cost of cultivation would be under this system with a labor wage of from 25 to 30 cents a day, the same as pertains in the Philippines and the same class of labor. Mr. Finlay, who also operated one of those up-to-date factories, estimates the cost of growing a crop of cane as follows: First crop, $60 Spanish money per acre; the second cutting (the first rattoon), $20 Spanish; the second and third rattoons, each $20 Spanish. This would be four crops from one planting, and the average cost would be $30 Spanish or $18 United States money. The cost of a rattoon is simply that of hoeing, weeding, keeping the ditches open, doing the thrashing, etc. From Mr. Finlay's books I found the actual cost as charged to be for producing 748½ acres of cane, $20,769.93, an average per acre of $27.75 Spanish, or $16.65 United States money. Embraced in this average is the expense of first, second, third, and fourth crops. The books further showed that it cost about $30 Spanish to harvest and deliver to the factory 1,000 quintals of cane. This would be at the rate of $6 Spanish per ton.

Exactly the same as we are contending for the Philippine Islands. There is absolutely no difference.

According to the best information gleaned from the best cane growers, the first crop on the best land yields from 35 to 40 tons per acre, on an average. On the best cane ground the first crop with the three rattoons would produce an average of from 15 to 20 tons.

Mr. Marr, the manager of the Canovanas factory, says that the first crop on good ground should be 40 tons per acre, with the rattoons ranging from 20 to 25 tons, but he says there is much land there that is tired out, from which may be expected such yields as the following (just the same as those tired out lands in Negros): First crop, from 20 to 22 tons; first rattoon, from 15 to 16 tons; second rattoon, from 10 to 12 tons. The average of the rattoons is about 16 tons per cutting. Mr. Finlay makes the following estimate: Good ground, first crop, 40 to 45; first rattoon, 20 to 25; second rattoon, 20 to 25 tons per acre; second-class ground, first crop, 40 tons, and rattoons, considered inferior, ranging from 12 to 15 tons. The same gentleman says that the best varieties are Salangore and Olaheiti.

Mr. Marr states that they extracted in sugar a small fraction above 10 per cent of the weight of the cane worked. Mr. Finlay says their sugar last year equaled 9.4 per cent of the weight of the cane, and for the two years preceding last year, 8.7 and 9.25, respectively.

HON. GEORGE I. FINLAY'S ESTIMATE OF THE COST OF MAKING SUGAR.

Mr. Finlay says that it will cost him 15 cents per hundredweight, United States money, to transport his sugar from the mill and place it aboard ship. The mill is 3 miles from the railroad and the station is about 16 miles from the seaport. It costs him 15 cents per hundredweight to ship his sugar from the seaport to New York. If shipped in bags it costs 2 cents more than if shipped in hogsheads. It costs him $1.74, United States money, to produce a hundredweight of sugar, including cost of cane. He figures the expense for delivering the cane to the mill at 2.72 cents per hundredweight of sugar in gold. This would make a hundredweight of sugar cost him at New York $2.0672, exclusive of import duty.

The statement of cost of manufacture is as follows:

Cost of Spanish money of making a hundred pounds of sugar.

Labor in works	$0.1772
Fuel	.0870
Bags	.1006
Repairs	.1600
Repairing railroad	.0366
Repairing work, carts, etc.	.0922
Care of 700 head of cattle	.0818
Taxes on mill and farm	.0110
General miscellaneous expenses, salaries, etc., not including interest on investment	$0.4415
Expenses on manufactured sugar, such as weighing, delivering to port, etc.	.1533
Total	1,4402

The total cost of making 1 ton of sugar, at the rate of $1.44 per hundredweight, is $31.68 Spanish. This, in United States money, would be $19. The cost of producing a crop of cane is estimated to be $1.45 Spanish per hundredweight of sugar, which would be $31.90 Spanish per ton of sugar, or $19.14 in United States money.

The cost of harvesting is put at $30 per thousand quintals (100,000 pounds, or 50 tons) of cane, or 60 cents per ton. Estimating the amount of cane necessary to make a ton of sugar as 10 tons, the item of harvesting and delivering is 60 cents multiplied by 10, or $6 Spanish, which equals $3.60 United States money.

Bringing together the cost of these various operations in their natural order, we have the following:

Cost of producing cane for 1 ton of sugar......	$31.90
Cost of harvesting cane for 1 ton of sugar.....	6.00
Factory cost of producing 1 ton of sugar.......	31.68
Total cost of production, per ton, in Spanish money........	69.58
Total cost of same, reduced to United States money..........	41.75

As the ton here used contains 2,204 pounds, the cost per hundredweight is $3.16 Spanish, or $1.89 United States money.

The following shows the daily wages paid in the Carolina factory: Boys from 15 to 30 cents Spanish, or 9 to 18 cents United States money. Men from 35 to 75 cents Spanish, or 21 to 45 cents United States money. Bosses about $1 Spanish, or 67 cents United States money. The average wages per day for men is about 50 cents Spanish, or 30 cents United States money.

Mr. Marr's statement follows. The estimates were taken from the books of the Canovanas factory.

MR. W. S. MARR'S ESTIMATE OF THE COST OF MAKING SUGAR.

In making up this table I have used the ton of 2,204 pounds and reduced all values to United States money.

The actual factory cost of making a ton of sugar, as shown by the books for a series of years, is $16.

Cost of cane	$19.20
Cost of manufacture	16.00
Cost of placing on shipboard..................	.96
	36.16

The difference of over $5 per ton between the cost of production at the Canovanas factory and at the Carolina factory results largely from the difference in the amount of sugar secured from the cane, a difference in favor of the former factory equal to about 1 per cent of the weight of the cane, or 220 pounds per ten tons of cane (the amount required to produce a ton of sugar at the Canovanas factory). This difference in product at $35.20 per ton, its actual cost at the Canovanas factory, is worth $3.52.

I wish to state that while it is my privilege to examine into the works of a great many sugar factories, in statements touching the sugar industry of Porto Rico, I have referred more particularly to Mr. W. S. Marr and Hon. George I. Finlay for two reasons: First, these managers have complete data covering all the workings of their establishments, which are equipped in such a way as to show up the resources of the sugar industry of the island when working under its best condition; second, through the courtesy of these gentlemen, I was allowed to gather from their books and experience every item of information desired, so that the statements given concerning them and their works are based on the actual facts.

Now, not to dilate too much, I will come right down to the cost of production. As Mr. Finlay says: "Bringing together the cost of these various operations in their natural order, we have the following: Cost of producing cane for 1 ton of sugar, $31.90; cost of harvesting cane for 1 ton of sugar, $6; factory cost of producing 1 ton of sugar, $31.68; total cost of production per ton, in Spanish money, $69.58; total cost of same, reduced to United States money, $41.75"—or over 2 cents a pound.

Then Mr. Marr's estimate of making sugar—Mr. Marr, of the Canovanas factory, the best factory at that time in Porto Rico. His estimate for cost of cane was $19.20; cost of manufacture, $16, and cost of placing on shipboard, 96 cents, which brings it up to $36.16—a difference of over $5 per ton between the cost of production at the Canovanas factory and at the Carolina factory, resulting largely from the difference in the amount of sugar secured from the cane, a difference in favor of the former factory equal to about 1 per cent of the weight of cane, or 220 pounds per 10 tons of cane (the amount required to produce a ton of sugar at the Canovanas factory). This difference in product at $35.20 per ton, its actual cost at the Canovanas factory, is worth $3.52.

That point is clearly brought out by a disinterested official investigator who went over the books of those companies, at 2 cents a pound.

Now, gentlemen, I have shown what the future cost of sugar will be, as compared with the phenomenal yields of Hawaii and two rattoon crops and coolie contract labor, and the cost, as compared with Porto Rico, with four rattoon crops and the world's average yields of 2 tons, and with labor on the same wage scale as the coolie, but inferior in efficiency. We have already proven that the Hawaiian system of cultivation is peculiar to itself, enforced on the planters by purely local conditions, and that they could not apply to the Philippines, so that for our purpose the comparison with Porto Rico is more to the point as reuniting all the same general characteristics as obtain in the Philippines in the future, but I am willing to go further and stretch this line of argument to cover other localities, and we will find that the same solution and general result is bound to occur. In the hearings before the Ways and Means Committee I made a special point, in comparing the future with Java, to show what the possible cost might be, but only in a rudimentary manner, as I thought the point made would be convincing.

I want to refer the committee to my statement before the Ways and Means Committee, where I pointed out that the cost of producing sugar in Java, with the lowest possible labor wage in the world of 10 cents a day, under modern methods of manufacture, is $1.40 per hundred, or $28 a ton. I will come to that later on. That point I made before the Ways and Means Committee, and dilated on it a little.

The point has since been advanced by the opposition that what Java could do in developing and increasing her crop the Philippines could also do, basing the assumption on a mistaken idea of the relative density of population and the methods employed in forcing the growth of the industry. As a matter of fact, the island of Java has a population of 28,000,000—a small island about the same as Luzon—against a population of 8,000,000 for the whole of the Philippine Islands; and whereas the labor wage in the island of Java might naturally expect to go down on account of their great population the labor wage in the Philippines is bound to increase. As a matter of fact, the "culture" system under which the Java industry has forged ahead was due to the Netherlands Government, which advanced the necessary capital for the erection of the factories and guaranteed to the manufacturers that the natives in the district would supply enough cane to make the enterprise a success, and forcing the native to give a certain proportion of his time to work in the fields. In return, the manufacturers contracted with the Government to sell it a third part of the sugars at a fixed price to repay the loan. This system proved so profitable as a revenue earner that it netted the Government an average income of over $3,000,000 a year for some time. The above conditions have been somewhat modified, and at present the natives supply some 80 per cent of the cane direct to the mill, without the intervention of the Government guaranty. The point in regard to the Java industry which must be borne in mind is the high average yield of the lands of something like 4 tons to the acre, which is 2 tons higher than the world's average.

Now, this requires explanation. The available lands for cane cultivation are restricted in area, and great estates are impossible, nearly all the native holdings being very small. If the lands were allowed to rattoon, there would be a big decrease in the crop and earning capacity of the farms, so that with cheap labor, the cheapest in the world to-day, it is more profitable to replant every year and secure the maximum yield than to allow the cane to rattoon and secure a diminution of one-third to one-half in the cane tonnage. That explains the reason why the yield in Java is maintained from year to year at its high average, and also explains why in no other place in the world can the same system be employed, except in a country with a high protected tariff. I might also add that the rotation of crops is compulsory in Java, and the lands, in addition to this rest, are carefully spaded, and the crops cultivated with the same care as the Chinese give their truck-garden patches. In other words, with the cheap labor the crops are nursed with great care.

It is undisputed that the cost of producing sugar in Java under all these favorable conditions is something like $28 per ton, or $1.40 per hundred, the same as it was in Hawaii, with higher yields and a similar class of labor.

In comparing this with possible Philippine development, and granting, for the sake of argument, the same high yield of 4 tons, and the same wage rate of 10 cents per day, the future cost laid down at the Missouri River will be as follows:

Cost at Iloilo..............................	$1 40
Freight..............................	.30
Insurance..............................	.04
Duty..............................	.42
Storage (1/8)..............................	.125
Shrinkage (2 per cent)..............................	.028
Commission..............................	.06
Difference..............................	1.00
Freight to Missouri River..............................	.49
Total	3.863

Or $3 96 at Denver.

At the lowest possible cost of production in the world to-day, with a labor wage of 10 cents per day and a yield of 4 tons of sugar to the acre, the cost, laid down at the Missouri River, would be $3.86.

So, granted this abnormally low estimate of comparison, we are still out of the race, but, as a matter of fact, our wage rate is now three times that of Java, or 30 cents per day, and our yields, even with modern methods, about half, so that in reality the cost of our sugars laid down at the competing district of the Missouri River would be over 4½ cents, and when we raise the wage rate, as is sure to happen under American stimulus, and then raise the freight rate, which is as sure as fate when the coastwise shipping law goes into effect, it will be seen that our sugars stand no chance at all, and with Mr. Palmer's prophecy staring us in the face of a beet cost of 2 cents, the above is only an idle dream, and it would seem that instead everything indicates that beet sugar will be imported into the Philippines within the next ten years.

It is absurd to think that the United States will ever foster and encourage the cane-sugar industry in the Philippines on the same basis as the Netherlands Government did in Java, and so promote a rapid development. On the contrary, the exact reverse is the case, for instead of forcing the native to work it is encouraging him to go to school, and one of our first acts was to free the laborer from the old Spanish law which compelled him to work out his money advances from the planters. At the present time the planter still continues to make the necessary advances to lure the native from his home, and after receiving the money in hand the latter works it out, or not, as it suits his royal convenience, and, as he is a free man, there is no law to compel him to live up to his bargain. So it can be readily seen that any rapid development of the sugar industry in the Philippines, as compared with Java, is not warranted by any careful consideration of facts.

Now, let us take a brief glance at the costs of producing cane sugar in other tropical countries with analogous conditions and see how they compare. I am going to ask you to come over and look into the industry in the British West Indies, where every condition is similar. You will remember that the industry in these islands has been in a precarious condition for many years, and the planters have, in many cases, been ruined, and that the situation was so grave, threatening the very economic life of the colonies, that in response to their appeals the British

Government in 1898 sent over a royal commission to study and make a report on the situation. Every island of the Crown was visited and complete hearings given the planters, testimony being taken and recorded, and in every instance the cost of manufacturing sugar was made the basic study. These hearings and report fill three large volumes and exhaustively cover every point. Now, what do we find is the average cost of production in these islands as developed by sworn witnesses?

In British Guiana, with an average yield in sugar of 1.7 tons to the acre and coolie labor, working with modern apparatus, the average cost per ton in the colony was found to be $47.50. The planters were dependent upon their labor supply from India, the government bringing in the coolies and contracting them for a term of years at a low rate of wage, and yet only those estates having the best soils and a succession of good seasons have survived. In Barbados, with a population of over 1,300 to the square mile, the home of cheap labor in the West Indies, and working with the old wasteful methods of the muscovado system, securing low-grade sugars the same as the Philippines with a labor cost of not exceeding 20 cents per day, the cost was brought out as $43 per ton. In the island of Trinidad, with an average yield of 1.2 tons of sugar to the acre and employing coolie contract labor, the cost wast $50 per ton, and resulted in closing down and ruining all those estates not equipped with modern machinery. In the island of Tobago the cost of producing a hogshead of muscovado sugar weighing 2,000 pounds was $35, or equivalent to $40 per ton, on a wage rate of 16 to 20 cents per day. In St. Lucia the cost in the central factories existing there was given as $50 per ton. In St. Kitts-Nevis the average cost was found to be $47.50 for muscovadoes, and in Jamaica for the same grades it was $36.50.

Gentlemen, these figures speak for themselves. In all these islands cited the planters enjoyed the cheapest kind of labor, not exceeding 20 cents per day, lands averaging 1½ tons to the acre of low-grade sugars, working with the most primitive outfits—in other words, an exact duplication of existing conditions in the Philippines—and we find the average cost something like $40 per ton, or 2 cents per pound, and they all went "broke." The same conditions as to average yields, average scale of wages, and average costs of ₱4 per picul, or 1½ cents per pound, or 2 cents with all charges added, obtain in the Philippines to-day, and for the same identical reasons the Filipino planter is reaching out his hand to you to save him from being wiped out. Gentlemen, when the facts were presented to her, and her statesmen grasped the full significance of the situation, Great Britain brought about the Brussels convention, Great Britain gave her colonies a square deal, and to-day with the same conditions prevailing in the Philippines, with ruin and foreclosure staring them in the face, the Filipino planter and the Americans of the islands turn to their Congress and appeal to them for the same justice, the same fairness, the same square deal that Britain conceded to her people in the hour of need.

Let me return to my comparisons. We have compared the islands with Hawaii with its high yields and coolie labor, with Porto Rico on ordinary yields and the equivalent to coolie labor, with Java and coolie labor and fair yields, and I have just shown you that with the same analogous conditions in the British West Indies as exist at present in the Philippines the sugar industry was ruined, and had to be aided by government intervention, but I am not through yet with my comparisons, as reference has been repeatedly made to Cuba, and citing that island as a criterion for the future of the Philippine industry.

Now, what do we find are the average conditions existing in Cuba to-day? We find modern mills equipped with the best machinery, fields averaging 2 tons of sugar to the acre, and rattooning for as high as fifteen years, and a labor cost of anywhere from 75 cents to $1 per day. What is the average cost of production under this system? I might answer it offhand from my own experience, having lived there for thirteen years, but my opinion might be called biased, so we will turn to the hearings on the Cuban reciprocity bill before the Ways and Means Committee in 1902 where the point was carefully brought out and dilated on by men who knew what they were talking about.

Mr. Edward Atkins, of Boston, owner of the Soledad Central, near Cienfuegos, testified that the cost was 2⅙ cents; Mr. Hugh Kelly, of the Central Teresa Company, at Manzanillo, said it was 2.16; Mr. Miguel Mendoza, of the Central Santa Gertrudis, at Banaguises, said it was 2¼ cents; Mr. Armstrong said that with modern methods it should be 2 cents; Senator Hawley, of Texas, of the Chapparra Sugar Company, said it was about 2 cents; Mr. William Bass, of the Central Consuelo, in Santo Domingo, said that at 3½ cents in New York he was being put out of business. Col. Tasker H. Bliss, collector of customs for the military government of Cuba, submitted six statements covering the cost in different districts, as follows:

Caibarien district, 2 cents; Matanzas district, 0.022; Cienfuegos, 0.025; Cardenas, 0.019; Habana, 0.02, and last an average for the whole island of 0.022 cents. Mr. Machado, of the Central Esperanza, gave the cost at 0.0206; Mr. Joaquin Piedra, of the Feliz Sugar Company, states 0.025, and Mr. George Fowler, of the centrals Dos Hermanos and Parque Alto, testified that it was 0.0239, f. o. b. steamer, at Cienfuegos. Now I may state that from my experience in Cuba these costs are all conservative. So here we have the costs as testified by gentlemen who knew what they were talking about, as they were all manufacturers; but we find that the beet-sugar opponents pursued the same tactics then as they are doing now, by attacking the veracity of the statements and striving to prove that the gentlemen from Cuba were exaggerating their costs, and instead of the 0.0225 average, as testified, the average cost should be taken as 1¼ or the lowest theoretical cost of the island.

It has always been a commonly accepted fact amongst Cuban sugar planters that, given certain conditions, such as new—virgin—lands, deep soils, favorable locations as to rainfall, and situating the mill house alongside the sea, with deep-water shipping facilities, so that steamers can come alongside dock for the cargo, that sugar could be produced in Cuba for about 1¼ cents per pound; but up to the time of the passage of the reciprocity bill there was only one estate in the island which reunited these favorable qualifications, but the losses resulting from the war had put them so far back they could never aspire to that low cost. As a matter of fact, several of the new and mammoth centrals erected since the war have based their calculations along this estimate; but, notwithstanding the accepted fact, other conditions have sprung up which have prevented the desired result, and instead of a cost of 1¼ as hoped for, it has been nearer 1¾ instead. The great saving as between 2 cents and an estimated cost of 1¼ cents lies in the fact of being free from excessive railway charges, which to the ordinary estate located in the interior meant an average increase of over a third of a cent on transporting cane and supplies to the mill and sugar to the shipping port, and the incidental warehouse and lighter rates.

Now, even granting that soil conditions in the Philippines were the same as in Cuba, a possible cost of 1¼ cents based on deep-water shipping facilities are impossible in the islands for there is not a place or deep-water port on any of the sugar islands where a central factory could be erected and have the steamers come up to the dock. The best that could be hoped for under the most favorable conditions is that the sea might remain calm enough for the steamer to anchor some 3 to 5 miles or more off-shore and have the sugars lightered out. This costs money, aside from the risks involved, and in touching on this question I might mention that anyone who contemplates building an immense central factory on any of the islands has a problem confronting him to get the massive machinery ashore and transported to the point of erection. In my opinion, for a long time to come, the sugars of the southern islands will continue to go to Iloilo in light-draft sailing vessels for final deep-water shipment, and there is no escape from it, and is an item of cost which must be considered. When some of the projected railways are built they will diminish the risks, but I am confident the freight rate to the port will be quite as high, if not higher; and if sugar is the chief crop of the district, sugar will pay the freight. It might be reasonably urged that in some localities on the coasts of the southern islands a central factory could be established and build its own wharf out into the sea for a mile for the steamers, and I will admit it for a minute, but only till one of our peculiar typhoons meandered along, after which you could look in vain for the long wharf, and you could go ahead and rebuild it—that is, if you had a $30,000,000 agricultural bank to help you out about twice a year to the extent of $50,000 a whack.

So I think we can safely eliminate from this discussion those centrals in Cuba which theoretically might make sugar for 1¼ cents and confine our comparison to the 90 per cent whose average cost is admitted to be 0.0225 cents.

Now, before we go any further with these comparisons, I want to raise an important point. It has been stated that the labor item represents 90 per cent of the cost of making sugar, which under given conditions such as prevail with old-fashioned methods may be about right, though a little exaggerated, but the minute we take a modern central factory, with all that it implies in the way of skilled and technical help, there is a difference. The salaries of a technical staff—administration, engineers department—are practically the same the world over, and while the field labor may be 90 cents a day in Cuba, 50 cents in Porto Rico, $1 in Louisiana, and 75. cents in Hawaii, the salaries of managers and staff remain about the same, and in the case of the Philippines they would be some 33 per cent higher, owing to the increased inducements and passage money both ways. When to this we add the increased cost of repairs, maintenance, transportation, freight charges, cattle losses, and depreciation and interest charges, incidental to a $500,000 enterprise the actual unskilled labor charge is more like 50 per cent than 90 per cent. The point is that in reality only about 50 per cent of the costs are subject to the fluctuations incidental to rise or fall of the labor market.

If we will take as a fair sample the detailed statement of cost submitted by Mr. Renton to Mr. Saylor, to which we have already referred, and separate the items into those representing all labor and those representing fixed charges, purchases, etc., we will find as follows:

Clearing, all labor	0.74		
Mule and steam plowing, one-half labor	.705	one-half fixed charges	0.705
Ditches, all labor	.20		
Cutting and hauling seed, all labor	.80		
Preparing and planting, all labor	.88		
Fertilizing, one-fourth labor	1.00	three-fourths costs	3.01
Watering, three-fourths labor	2.72	one-fourth.	.91
Hoeing and weeding, all labor	.76		
Stripping, all labor	1.49		
Cutting and hauling, three-fourths labor	2.61	maintenance, one-fourth	.87
Pumping		fuel and maintenance	2 42
Sundry			5 33
Manufacture, three-fourths labor	1 9875	one-fourth maintenance, etc	6625
Containers			.99
Labor	13.8925		14.8975

So it will be seen by the above analysis of the costs on the Ewa that the actual labor cost is 13.89, or about 48 per cent of the total, against 14.89 for salaries, maintenance, fixed charges, etc. However, to be fair and allow for different conditions, we may take for our purposes that the proportion of cost affected by the variance in wages is, say, 50 per cent, and having determined this point let us compare the Philippines with a wage rate of 30 cents with Cuba on a wage rate of 90 cents:

Average cost in Cuba	0.00225
50 per cent salaries, fixed charges, etc	.01125
50 per cent labor	.01125
One-third less	.00375
	.01500

Here we have the cost as compared with Cuba on a wage rate of 30 cents per day at 1½ cents per pound, granting all the soil conditions the same. Now, if we increase our labor cost to 50 cents per day, which is inevitable, as it approximates that rate to-day, we have evidence presented here by the honorable Secretary of War that Mr. Wheeler, who is operating a lumber company in northern Negros, is now paying 37½ cents, and transporting rice and other comestibles free, so they can be had at Manila prices, it will be seen that at this 50 cent labor wage the cost of producing sugar in the Philippines as compared with Cuba will be 0.017. This again brings the cost laid down at the Missouri River the same as we have already figured out with respect to the comparison with Hawaii, or 3.9575 with labor at 30 cents and 4.16 with labor at 50 cents. And right here I want to state that the efficiency of the Cuban laborer is about twice that of the Filipino, which makes a material difference and would probably affect the initial cost of 1.70 to the extent of raising it to 1.90 or 2.

So, gentlemen, I will again assert that no matter where you turn to for a fair comparison it will be seen that the equalizing laws bring the average down to about the same thing. In Hawaii they were 1½ cents with coolie labor and 2 cents without; in Porto Rico they were 2 cents with coolie labor, and in Cuba 2¼ cents with labor at 90 cents, 1½ cents with labor at 30 cents, and 1.7 cents with labor at 50 cents.

If we apply the same rule to Java, with a cost of $28 per ton, or, say, 1¼ cents per pound at 10 cents per day, and apply a labor rate of 30 cents, as in the Philippines, we have as follows:

Cost	$0.0125
Salaries, maintenance, etc., 50 per cent	.00625
Wages represent 50 per cent,=.00625, multiplied by 3 to equalize Philippine scale	.01875
Comparative cost at 30 cents	.025

Cost	$ 2.50
Freight	.30
Insurance	.04
Duty	.42
Storage	.125
Shrinkage	.05
Commission	.06
Difference	1.00
Freight to Missouri	.49
	4 985

or again equalizing conditions throughout the world, if cane was planted every year, as in Java. This would make a cost of 4.985 laid down at the Missouri River.

If we now assume the same wage in the Philippines as in Java, or 10 cents per day, and take our possible average of 2 tons of sugar to Java's 4 tons, it will be seen that the producing power of the 1¼ cents cost in Java is double that of the Philippines, so that the cost to raise the 4 tons to the acre in the Philippines, on the same wage rate, would be double, or 2½ cents, or again equalizing conditions throughout the world.

Now, I have clearly demonstrated to the committee that whatever comparisons the oppositions have made, if we take into consideration surrounding conditions and be fair, it will be seen that the Philippines' cost of producing sugar will be between 1½ and 2½ cents, the same as the other cane-sugar countries, and that even under the lowest possible cost of 1¼ cents it stands no show in the future competition with the home beet.

Now, I have finished with that phase of my statement, and have only gone into it at all because I have been forced to take cognizance of their repeated assertions that we could produce sugar cheaper than any other country in the world. We will now get down to the real point.

Now, gentlemen, we have taken the opposition at its own value, and have clearly proven that under any comparison they take it is impossible for Philippine sugar to seriously compete with the home-grown product. But I must call your attention to the fact that I have been comparing our future cost on a basis of a 25 per cent duty, as provided in the bill for three years only, and our opponents might with justice cry out that I was trying to hide the real point that will come with free trade, lowering the cost some 42 points. But I do not intend to shirk it, though in granting this I must again demand certain concessions in our economic conditions that are inevitable.

When we come under absolute free trade we must also come under the operation of our coastwise laws, now held in abeyance. Does not experience teach us, wherever American transportation companies have a complete monopoly, the freight rates are out of sight? Does not the experience of the Hawaiian Islands, whose freight rates to the mainland have doubled since annexation, point out what we may expect under similar conditions in the Philippines? Can we alone expect to be favored in all this great nation and freed from the penalty attached to free trade? What does this imply? It means that average freights, which are now $6 per ton, will increase to $12, or $0.60 per hundred pounds.

When, in the due and logical course of events, the Philippines assume their share of the Federal burden, turning over to the Federal authorities the customs receipts, diminishing to that extent the revenues of the insular government, will not the deficit have to be made up by full internal taxation? Will it not be just, after planters have been given a profitable market, that they resume their share of the general taxation of their lands, which law is now repealed for some years? Will not this and other items have to be added to the cost of production? And then as development is stimulated, as new enterprises call for more efficient labor, will not the labor wage rise steadily toward the unit of the dollar mark? All these are but a repetition of what has occurred in Porto Rico and Hawaii, and the Philippines will prove no exception to the rule. Will not the building of the railroads, the construction of immense public works and improvements, the exploitation of the forests, the opening up of mines, the development of the great hemp monopoly, and other such enterprises call for their quota of labor, and will not the competition stimulate and advance wages? If it does not, gentlemen, it will be directly contrary to all laws of supply and demand. We must accept of what experience teaches and anticipate this natural rise in labor wages. If the normal wage in the cities to-day is $0.50 and $0.30 to $0 37½ in the country, for any large demand, the inevitable result is that in a few years this will advance to $1 in the large centers and 50 to 75 cents in the fields. I say in a few years, but this will occur as soon as a sudden demand is created, as only under a high inducement can the Filipino be persuaded to work, and this to be really successful must include the transportation of his entire family to the labor center, where proper houses have to be ereeted to keep him there. So when we look forward to what the probable cost of sugar will be under free trade, we must in all fairness confront the changed conditions inevitable to such a situation. Of all the comparisons already made, the most equitable, as fitting all our conditions, was the one with Porto Rico, and we can safely estimate on a future average cost of sugar in the islands at 2 cents, or the world's average. Under the changed conditions, add 60 cents freight and insurance, $1 differential, and 49 cents freight to the Missouri River, and the other constants, and we have a total of $4 35, deduct a half a cent if you want, and we are still out in the cold. Under no possible estimate or calculation, based on reasonable data, can the cost be brought down to less than a cent, as the opposition would have it. So here we have looked again into the future from a sound, practical standpoint and we find that they are still in error.

The point has been raised by Mr. Humphreys in his testimony here before this committee that the yearly increase of production in any one of our sugar-producing centers is more than ample to cover the annual increase of consumption, which he places at an average of 63,000 tons for the ten years ending 1905. Mr. Humphreys bases his figures on the estimates of Willett & Gray for the coming crop, which shows a great increase for all countries. When the Cuban reciprocity bill was under consideration and the issue between the refiners and the beet-sugar people, the latter openly challenged the accuracy of Willett & Gray's statistics, and charged them with being under the influence of the trust. I see they have experienced a change of heart, and the authority they then despised they now call on for aid.

But they bring the point up and state in effect that the annual increase in the beet, in the cane-sugar product of Louisiana, of Porto Rico, and Hawaii can, individually, take care of the annual increase of consumption. Let us look into this and analyze the statement.

It is generally conceded and accepted as a fact that the Hawaiian Islands have reached the limit of their production and can never hope to pass 450,000 tons. The limited land area, coupled with the scarcity of labor, absolutely prohibits any further expansion of the industry, and at the present time, aside from the high costs of cultivation, the great problem to be solved is that of labor. It is conceded among the Hawaiian planters that a production of 500,000 tons is possible, but that the extra 100,000 tons would be produced at a loss. I have already explained why it is unprofitable. Hawaii has always had her labor problems, even before annexation, but the situation is now so acute that they are talking of establishing an immigrant station at New York in the hope of inducing Europeans to settle in the islands. They have tried all kinds of cheap labor—Kanakas, South Sea Islanders, Chinese, Japanese, Koreans, Portuguese, and Porto Ricans—but the final judgment is that they must turn to the white man. As our party passed through Honolulu the authorities and sugar men were arranging with some Russian elders to bring in several hundred of their countrymen.

As to Louisiana, the situation there is notorious. They are not only handicapped by having an industry foreign to the soil and climate, but their labor supply has steadily decreased. The negro element—the old mainstay of the plantations—has been enticed away by the higher wages offered by the railroads and other industrial enterprises, so that to-day the Louisiana planter is at a loss for proper and sufficient labor. Like his Hawaiian brother, he is "up against it," and although there are unlimited alluvial lands in the State capable of cultivation the lack of labor to work them is a bar as insurmountable as though they were limited in the actual acreage uuder cultivation. The Louisiana planters have also turned to foreign immigration as the only means of saving their industry. Immigrant stations have been established at New Orleans to catch the new arrivals from Italy and entice them out to the cane fields, and they also talk of extending their propaganda and efforts to other ports. Like their Hawaiian confrères, they want cheap labor—the cheaper the better—and they confess that they have had many Filipinos working there with good results. It can be safely accepted as a fact that the lack of labor constitutes a perfect check on the further development of the Louisiana cane-sugar industry, and while the crop may advance a few thousand or more tons, owing to the stimulus of a high market like last year, it will dwindle again to the old output, and decrease rather than increase.

As to Porto Rico, there is considerable discussion as to the capacity of the island. They have the population, but the area is limited. Every available plot of soil is under cultivation in some crop. All the lands can not be put into sugar, and conservative estimates place the limit as between 250,000 and 300,000 tons, and nearly all the available cane acreage is now planted to that crop. (Note Willet's testimony corroborating.)

Now, as to Cuba, it would be folly to attempt to make any statement of the capacity of the lands for cane as a limitation to her output, and here again the line is drawn by the available labor supply. Our friends of the opposition point with glee to the great development of the Cuban industry in the last few years—from 600,000 to over 1,000,000 tons—and attribute the advance to the working of the reciprocity treaty, when, as a matter of fact, it was the natural recovery from the disastrous effects of the insurrection and war. In 1894 and 1895 Cuba produced over 1,000,000 tons, and the rapid increase after peace was declared was due to the return to normal conditions. Last year, which is everywhere admitted as a phenomenal one, encouraged the farmers to increase their acreage, but it is an undisputed fact, widely commented on in the technical journals, that the new plantings were so large that no consideration was given to the extra labor necessary for moving the crop, and, as a fact, the estimated increase of something like 200,000 tons called for the employment of nearly 40,000 extra laborers, and no visible means of securing them. The labor question has occupied the Cuban planters to the exclusion of every other topic. As we enforced on Cuba our immigration laws, it has placed a check on bringing in cheap coolie labor, and the hope of the island, like Hawaii and Louisiana, is in the encouragement of labor from Europe. For Cuba to greatly increase her output means that she will have to adopt the same methods as Hawaii, which is really unprofitable and unlikely, or she will have to greatly increase her immigration.

As to our home beet-sugar industry, the lack of efficient labor is also the most formidable obstacle to any rapid development, as it is conceded that the independent American farmer will not lower himself to carry on the slow, tiresome, menial drudge work necessary to successful beet-sugar cultivation in the field, and wherever beet raising is a success it is because entire families are engaged in field labor, where the mother and daughter and little boys of 10 years perform the same work and are just as valuable as the full-grown man. It is a fact that entire families of Russians are imported into Michigan from Nebraska to cultivate the beet farms, and the man's efficiency is in direct proportion to the size of his family. Mr. Collins, operating a beet-sugar factory in Ohio, in the presence of this committee proudly exhibited the photograph of one American family of fourteen, composed of father, mother, daughters, and various young children who were working in his beet fields. Talk about coolie labor or the peons of Mexico; it is far more honorable, far more becoming to us as a nation to encourage a natural industry in the distant Philippines than to foster and build up an unnatural home industry which degrades the mother and daughter and drags them down to the same level and plane as the peasant women of Europe, who monopolize the work on the farms.

Don't pass this bill, say the beneficent beet-sugar magnates, for by so doing you will enslave the poor benighted little brown Filipino, you will forge the links which chain him to a life of slavery in the tropical cane fields, under the lash of the cruel American oppressor and exploiter, and we protest in the name of humanity against the barbarous measure! Lend us your ears! Extend to us your aid! Come with us to Colorado and, when this fair land is dotted with the hundreds of beet-sugar factories, when the land is blanketted with thousands of beet farms and you are drinking your morning coffee sweetened with the sugar produced at home, you can think of the great good we have accomplished, think of the motherhood of our farming regions released from the drudgery of the washboard and the kitchen and elevated to the higher and nobler mission of thinning out beets on her hands and knees under the summer sun, so that your lives may be sweeter; think of the youth of our farming districts—the thousands of small boys and girls—the future hope and greatness of our country—liberated from the tyranny and the rod of the village schoolmaster and the reformatories, and their young lives enlightened and their physique strengthened by bringing them into direct touch with nature in the glorious beet fields. Think of the great benefits bestowed on our race and how this menial, slow drudgery will develop the children of our rural population into a more hardy, more intelligent type than their rugged, independent American ancestor. Don't let the coolie work in the land where he is at home; let down the bars so he can come to Nebraska. We need him there to keep company with the Russians, Poles, Japanese, Indians, Mexicans, and other so-called American laborers. That is what home grown American beet sugar means.

Our friends of the opposition, who are so worried over the future of the poor Filipino, who express such benevolent and altruistic views for his emancipation, and who see over there in the jungles of those far-away islands millions of future serfs for the cane sugar barons, why don't they put into practice what they preach? If they are in earnest about their salvation, why don't they go over and secure a few thousand to work their beet fields and release our own race from the degrading yoke? There is no law that I know of against the importation of Filipino labor, so the altruistic beet, the enterprising Hawaiian, and Louisiana planter can surely have no objection nor find any difficulty in solving their troubles. They say the labor is there in abundance, despite all that others have said to the contrary. All right, I answer, more power to you, go and get them; you need them in your business. Why don't they try? We have tried. We have tried to induce them to go from one province to another and failed. We have shown those who were starving in Cebu that they could earn $2 gold per day in the hemp fields of Sorsogon; we have offered two months' pay in advance to entice the Tao from his nipa shack in Capiz to the cane fields of Negros; we have sent out men in the provinces of Pangasinan, Isabela, Nueva Ecija, and Pampanga to enlist laborers for the Benguet road, and we have failed to budge him away from his guitar and his vino. But we don't know anything over there. We Americans are not up to the ways of the natives. No, only the American beet-sugar men know what they are talking about; they know better; they can do what we failed to do. Well, there's the islands, there's the labor, and here's the demand. Why don't they try? Mr. Hatch, representing the Hawaiian planters, when asked the question, condescended to honor us who know by stating the Filipino would not leave home. We told him that—he don't know it from his own knowledge. Let him try.

Maybe, gentlemen, the future will show that we exiled Americans in the far-away islands know what we are talking about.

COST IN PHILIPPINES.

Now, what do we find in the facts as to the actual cost of production in the Philippines to-day? Various testimony has been advanced by both sides to make their arguments plausible. The beet-sugar people, through Mr. Hathaway, Mr. Palmer, and others have shown that sugar could be produced at less than a cent a pound and corroborated this statement with data secured on the ground or with testimony presented to the Commission in the Philippines. It was this particular phase of the situation that I spent some two months in investigating, as a practical expert, for it was clear to me that there was some error in the details of cost. The honorable Secretary of War, in his testimony before this committee, conclusively proved that at the low cost of production, as advocated by our opponents, the Filipino planter could have made enormous profits by shipping his product to this market, yet for the ten years only a paltry average of from 4,000 to 5,000 tons came over here. With a great market waiting for the goods and a magnificent profit on the cost, they failed to increase their product, and instead actually kept going deeper into the hole, finally striking the bottom, and were buried under the avalanche of debts. Mr. Palmer, in his primer or catechism for the beet-sugar manufacturers, lays great weight on the cost of 95 cents per 100 as given by the Philippine Sugar Estates Company. Maybe they are right, but despite this abnormally low cost and corresponding high prices in the world's markets this company went into liquidation.

Señor José Puig is owner of sugar hacienda "Inaun," located at San Fernando, Pampanga. The depth of soil on his estate averages 3 feet and is plowed to a depth of 6 inches. The lands, like most of those in Pampanga and the plain extending northward from Manila Bay, are about at sea level, being so low that proper drainage is impossible, so that with a wet season the water remains on the ground and drowns out the growth of the cane. This condition, existing up to above Angeles, is a disadvantage which in the course of time will kill the cane industry in Pampanga and bring the lands under rice cultivation, for which nature has adapted them. The wage system under which Mr. Puig operates his estate is as follows: The owner supplies the land, house, carabaos, plows and seed, and other tools and necessities, and the colono receives in return one-half of the product in rice and half of the sugar, less 10 per cent for the cost of manufacture. During the season the colono receives a monthly advance of 5 to 7 pesos to meet his minor necessities. Under this system it is extremely difficult to arrive at any fair rate of wage, as the accounts of both sides are a tangle which would puzzle a "Philadelphia lawyer." Now, this system is similar to what obtains in Cuba under the central factory system, where the factory owns the land. The average price paid to the independent farmer in Cuba for his cane delivered at the mill is 5 per cent of the weight in sugar, or its equivalent in cash at the current market price. When, however, the factory owns its lands, and labor is scarce, they make a contract with a farmer to cultivate so many acres, supplying him with land, seed, cattle, tools, carts, and money advances, and pay for the cane at the same rate as paid to the independent farmer, and divide the returns with their colono, and yet there is no complaint made there that the colono is enslaved. He can break the bargain whenever it becomes unprofitable to him or whenever the factory fails to carry out its part of the contract.

Under this share system, as obtains in Pampanga, the actual cost is only known at the end of the season by the difference between expenses and receipts, and last year, when sugars sold at an average of ₱6 per picul, the planters acknowledged to have made a little money.

For instance, Mr. Antonio Consenja, owner of the hacienda "Magliman," at San Fernando, admitted that last year he made ₱1,500, which really was not a profit, but simply the amount left to him as overseer and manager of his own estate and factory. This is a sample small mill. His plantings were sixty balibas, or acres, which yielded 900 piculs of sugar, an average of 15 piculs per baliba. The cane is planted in rows 2½ feet apart and 1 foot between seed, and he never had a rattoon crop. The mud from the beds of the rivers is dredged out and scattered over the lands to serve as a fertilizer. His factory equipment is a small 6-horsepower 3-roller mill and engine, with three open batteries of five kettles each. His estimated cost was difficult to ascertain, but he opened his books in the presence of the governor of the province, which showed that this apparent profit on 900 piculs, at an average selling price of of ₱5.50 per picul, was ₱1,500. In other words, he had this amount as between his expenditures of ₱3,450 and his receipts of ₱4,950, or an average cost of ₱3.63 per picul, which did not include any salary for himself or allow for loss in cattle, interest, etc.; so it can be fairly estimated that his cost was ₱4 per picul.

Mr. Joaquin Lingiano, of the hacienda Santo Tomas, at San Fernando, testified to me in the presence of the governor that he had planted the year previous 120 balibas, from which he had secured a crop of 1,200 piculs, or 10 piculs per acre, or 1,375 pounds of sugar, and in bad years it was much less. His outfit was a little 6-horsepower mill and engine, with four batteries of kettles, averaging 30 piculs a day output. His accounts showed that he had sold his crop at an average price of ₱5 per picul, or a total of ₱6,000, and his apparent profit had been about ₱1,200, or ₱1 per picul. As he was working on the share system, it was pointed out that one-half of this profit went to the colono.

Mr. Juan Nepumaceno, operating a small steam mill at Angeles, stated that for the crop of 1905 he had planted 220 balibas of land, from which a crop of 2,520 piculs had been secured, or something like 11 piculs per acre, or 1,507 pounds. His books showed that he had received an average price of ₱6 per picul, or a total of ₱15,120, and acknowledged to have made a profit of ₱3,000, or a cost of something like ₱4.80 per picul. His lands have to be planted alternately with rice and sugar, so he only secures a crop of sugar every two years. This yearly planting would naturally raise the cost somewhat.

I might go on and cite several such instances, but I desire to include as an appendix two distinct detailed costs of making sugar, which will elucidate the point, while not taking up the time of the committee.

Now, Mr. Hathaway and others claim that the cost is somewhere nearer a cent than a cent and a half, and I do not wish to attack his good faith, as these were probably the costs he received from parties who looked upon him as a possible investor, and it might even be granted that in some instances the costs from the books could be brought down to a cent a pound or less; but, gentlemen, if we accept that cost, I want to say that it is only possible by the planter failing to pay his labor and is a strong indication that in some places the old system of peonage has not yet been eradicated. There are on some estates a certain proportion of labor who live there with their families, their forefathers have lived there before them, and it is the only home they have. They receive land, rent, and house free and rice from the owner, and also a small stipend. You can't drive them away, and they prefer to stay where they are known than to go somewhere else where they would be compelled to work harder. But this condition is only transitory, it can not exist indefinitely under the new order of affairs, and in looking into the future under American rule we must face the question of paying for the labor, and when we estimate the cost through all its details it will readily be seen that sugar cost of less than a cent is only possible by defrauding the native.

The divergence of figures between 1 and 1½ cents is not so great and might also indicate the location or accessibility of the lands and their proximity to a shipping port. The costs of beet sugar, as testified here, vary from 3½ to 4½, or over a cent a pound, so it is fair to assume that a variation of a cent can also occur in the islands, or from 1 to 2 cents, with 1½ as the average.

But the present cost of sugar has nothing to do with the future and is only cognate to the discussion as showing that the planters need relief, for with changed conditions, central factories, and modern methods entirely new conditions and estimates come to the fore, displacing the present cost and its relation to this bill, and our only real topic or argument is what the future holds out.

Theoretically, on paper, it can be demonstrated that sugar in the Philippines can be produced at 1 cent, but, like everything theoretical or prospective, it does not work out in practice. In Cuba the theoretical cost under the most favorable conditions is 1¼ cents, but the actual average in practice is over 2 cents, and with beet sugar it is fair to assume that the theoretical cost is rather below 3 cents; but, if we accept their statements, it has not materialized in practice. In the prospectus of new companies it is placed at 3 cents to secure stock, and in 1899 Mr. Oxnard quoted 3 cents as the cost of making beet sugar, to promote his construction company, and later had to acknowledge he was wrong. So the same old rule must work out in the Philippines and instead of a theoretical cost of 1 cent or less, as given out to influence capital, the actual working cost is nearer 1½ or 2, if we include interest, depreciation, etc.

Average cost in Pampanga.

[From data secured by George Bronson Rea.]

Lands under cultivation (approximate).

Yield of Muscovado sugar per "balita," maximum 20 piculs, minimum 15 piculs.

Crop of 1904, 2,100 piculs or pilones.

Value of lands, based on yield of 15 piculs=₱49 per balita.

PLANTING EXPENSES.

Plowing 1 balita, 1 man and 2 carabaos, with native plow, average ₱2 per time, 5 plowings, at ₱2	₱10.00
Harrowing, 2 times, at ₱1	2.00
Furrowing, 1 time, at ₱1	1.00
Drainage ditches	3.00
Planting 10,000 points	2.00
Hoeing and weeding	7.50
Total	25.50
Yield of balita, 15 piculs; cost per picul	1.70

CUTTING CANE.

Work paid for on basis of each 10 piculs of sugar manufactured at mill, called a tarea or task, per task	.75
Food cost for above	.20
Cartage to mill, per task	1.00
Food cost for above item	.40
	2.35
Cost per picul	.235

MANUFACTURING EXPENSES.

Capacity of mill, 35 piculs per day.

Average day's work, 30 piculs per day.

Engineer (salary), per month	30.00
Fireman (salary), per month	15.00
	45.00
$\frac{₱45}{25 \text{ working days} \times 30 \text{ piculs per day}}$, per picul.	.06
Mill men: 10 men, at ₱0.12½ per task and food; 10 men in a shift, at ₱0.20 per day and food $= \frac{10 \text{ times } ₱0.125 + \text{ten times } ₱0.20}{30}$	.11
Sugar boiling: ₱2 per task, or ₱0.20 per picul	.20
3 men to battery × 6 batteries=18 men; 2 sugar boilers=20 men × ₱0.20=₱4 food cost $\frac{4.00}{30}$=per picul	.13⅓
Six firemen for six batteries (wage, 0.30+0.20 food=0.50), six times 0.50=0.10 per picul	.10
Fuel, ₱4.50 per day=per picul	.15
Hauling to town, per cartload of 7 piculs =₱2.00=0.285 per picul	.285
Food of engineer and firemen	.013
Pilon (container)	.50
Lima and oil	.05
Freight to Manila	.20

Planting expenses	₱1.70
Cutting and hauling	.235
Manufacturing	.766
Hauling to town	.285
Container	.50
Lima and oil	.05
Freight to Manila	.20
Overseer or owner's wages at ₱1.50 per month =₱1,800 per year= $\frac{1,800}{2,100}$ = per picul	.85
$\frac{4.58}{137.5}$ per pound = ₱0.033, or United States currency, $0.016 per pound	4.58

COSTS IN NEGROS.

Now I want to submit a fair sample of detailed cost of making sugar in the island of Negros, and call your atttention particularly to just where the opposition have made their error and also where the average Filipino planter errs in computing his actual costs.

In Negros the unit of land measure is known as the "lacsa," comprising 10,000 plants or stands of cane on a plantation. When crops are good a "lacsa" of new land will produce an average of 30 piculs, when poor about 15 piculs, while on the older lands the general average is about 16 piculs, or 1 ton. There are 3 "lacsas" of cane seed to 1 hectarea of ground, or equal to five-sixths of an acre.

There are some new lands that give still better results, and there are others that fall far short of this average, but, generally speaking, 20 piculs per "lacsa" in what are classed as average harvests. On this fair average basis we will make an estimate for a plantation of 200 "lacsas," a 4,000-picul harvest, commencing with the expense of cultivation, milling, packing, and transportation, until the product is placed on sale in the market for the farmer, or, in other words, in the port of Iloilo, and it must be remembered that though the work of preparation is usually less costly in soft ground, there are other lands on which the expenses run much higher than those which are here set forth:

Planting and cultivation.

[Expenses per "lacsa."]

Four preliminary workings of ground	₱12.00
Planting or seeding	4.00
Three plowings and cleaning of plants	13.00
One final working	5.00
Total	34.00

The ₱34 for expenses of cultivation per "lacsa" will give us ₱1.70 per picul.

Cutting and manufacture.

[Expenses per picul.]

Cutting and carting of cane	₱0.35
Sun drying of bagasse	.10
Ovens and mill	.27
Total	.72

Packing and transportation, etc.

[Expenses per picul.]

Bags and rattan	₱0.13
Packers	.02
Carting to wharf	.25
Lighter transportation	.20
Expenses of delivery in Iloilo	.10
Agent's commission, Iloilo	.10
Total	.80

SUMMARY

Cultivation, per picul	₱1.70
Milling, per picul	.72
Transportation, per picul	.80
Total	3.22

or an apparent cost of ₱2.30, or $1.15, per 100 pounds.

Now, if we rest on this as the final or absolute cost we would be greatly deceived, as much deceived as the planter who stops here with his details. It is true that the above is a fair average of general expenses, for in a reunion of planters held at Bacolod under the direction of the provincial governor they all more or less agreed on the point that the cost to plow, plant, and cultivate a "lacsa" would average ₱34, and I also ascertained, by a practical example on Señor Luzuriaga's estate, that the cost of cutting, hauling, and manufacturing was 80 cents per picul, by contract, as that was the price agreed upon with the contractor under which the crop was being harvested. In Mr. Luzuriaga's case I figured his bare costs down to ₱2.50 per picul, but, as in the estimate submitted, there are many other items which have been omitted entirely—the salary and maintenance of the manager and the permanent salaried force, oil, light, expenses of the plantation house, veterinary charges, repairs, commissions to labor contractors, loss of cattle, and other minor legitimate and necessary items. Without going into all of these, but just taking up the most prominent, we find on revision of the above as follows: A plantation to produce 4,000 piculs, with the expenses already noted and the following, will be:

Costs of 4,000 piculs as indicated, at ₱3.22	₱12,880
Salary of manager	1,000
Salary of assistant	480
Maintenance of above, at ₱50 per month	600
Four outside foremen, at ₱15 per month	720
Maintenance	288
Rice for laborers (500 piculs, at ₱5.50)	2,750
Light, oil	60
	18,778

Or a cost per picul of ₱4.69.

And yet we have failed to include interest, repairs, depreciation, taxes, and other legitimate charges which are always difficult for any outsider to secure, but the above is ample corroboration of the costs as advanced by those interested in this measure, and it will be seen all the way through that the wages are kept way low, with the rates prevailing in other years.

And yet we have failed to provide for the loss of cattle through epidemic diseases. In 1902 about 40 per cent of all the work cattle died. As a concrete example, which will appeal to the members of this committee who visited the islands and were entertained at the estate of Mr. Lacsos, at Talisay, I might state that I visited the place just about a month after their departure from the islands, and I found the rinderpest had again broken out, and on Mr. Lacsos's estate out of a total of 250 head of carabao 65 animals had already died of the scourge. Other planters also lost a similar proportion, but the board of health was overcoming its further spread. Now, a fair carabao is worth ₱150, or $75 gold, so we see that in less than one month Mr. Lacsos's loss in this one item amounted to $4,875 gold, or his entire profits from his small farm wiped out for the year.

There is a belief, and although erroneous it is persisted in, that sugar is produced at a little more than ₱3 a picul, and from this hypothesis, based at times on the testimony of farmers but little familiar with accounts and absolutely indifferent to the practical result of their exploitations, arise the prejudices which so seriously injure this industry.

At other times, when carts used to cost from ₱25 to ₱30, a good carabao, or ox, ₱50 at most, transportation and freight much less than to-day; when help could be had at smaller salaries, and when everything else was in the same proportion, a picul of sugar came out at ₱3 or more, indeed, rather than less. There was then no land tax, no tax on carts used on plantations, no tax for the re-marking of cattle, all of which tend to increase still more the cost of a picul of sugar. There were roads and bridges which, though poor, made the carting more economic than now, when there are neither good nor bad.

Even this sample statement of costs is open to wide variations, depending on the haul or transportation charges, due to the distance to the coast, and when we vary the yield per "lacsa" and bring it down to the lowest or poor year the costs double.

It is not difficult to analyze these costs and convince yourself of their correctness. Starting on the basis of plowing a "lacsa," or, roughly, an acre of land, we have a cost of ₱3 per time, or $1.50 gold. Now, it usually takes a good frisky carabao and his affinity, the tao, about five days to get over this amount of ground in haste, or an average wage cost of 30 cents per day, or about the basis which it is claimed he is receiving. Parting from this basis it can readily be seen that the estimate is a fair one.

Now, gentlemen, I am going to ask you to exercise simple common sense in deciding which side is correct in this question. I don't request you to take my word or believe my statements unless you so wish, but I do ask you to stop and consider this matter of costs from the evidence submitted. It has been clearly demonstrated what the great profits would have been had the Filipino planter produced his sugars at less than a cent a pound, and yet we see that they have been tobogganed to ruin and bankruptcy. Delegations have submitted their detailed costs in the hearings at Manila, Mr. De la Rama has again reiterated his statements here in Washington, and I have submitted the results of my investigations, and the burden of all the evidence is that it costs about $4 per picul, or 1½ cents per pound to manufacture and deliver Filipino sugars to the port of shipment.

Let us turn to the last page of the published hearings before the Ways and Means Committee of this session and look at the final affidavit submitted by Mr. John Heil, the superintendent of the government farm and experiment station at La Carlota in Negros. This is official, and it states that the yield per acre was 1¼ tons of sugar, and that the cost per picul landed at Iloilo was $9.50, or over 3 cents gold per pound.

What does this indicate? The first impression is, that if the Negros planter is producing his sugar at 1½ cents and the government farm at double that cost, the management of the latter is not efficient and the methods open to investigation. But this idea is erroneous, as it simply indicates what the real cost of sugar would be throughout the entire island on a similar scale of wages and transportation charges due to distance from the coast. If this difference in cost existed in the management of a modern central factory, you might well charge extravagance and inefficiency, but with the most rudimentary methods, calling for a minimum amount of intelligence, it simply demonstrates the difference in costs as affected by the higher scale of wages, the employment of modern farm machinery and American mules versus carabao, and intelligent, well-paid supervision, and high costs offered. Here the scale of wages and transportation charges are considerably higher than that paid by the farmers, and we have as a result a proportionate increase in cost.

So we have verified and supported our side of the case by two powerful comparisons; first, we have shown that under identical conditions as to wages, yield, and machinery the cost in the British West Indies, as sworn to by competent witnesses before the West India royal commission, averaged the same as in the Philippines, or 2 cents per pound, and we now see that right in the islands under government supervision and control, working with improved implements, scientific cultivation, and a higher wage, the cost is just doubled, or 3 cents.

Gentlemen, I rest this point, with confidence in your sense of fairness as to which side has stated the truth.

Now, gentlemen, let us look at the actual conditions of crop and yield as obtains in the Philippines to-day. What are the yields per acre in sugar, and what is the tonnage of cane? The yield of sugar per acre is a known quantity, and varies greatly in different parts of the islands, owing to difference in soil conditions, climate, species of cane, density of the juice, and the mechanical apparatus and process employed in working up the product.

The first requisite of good cane to give the maximum yield in sugar in any process depends upon the density and purity of its juice, and this is naturally in turn dependent on the soil and climatic conditions, and whether the cane is allowed to ripen properly before cutting.

Now, it has been intimated here by Mr. Humphrey that we did not know in the Philippines anything about our cane, or whether we are getting one-half or one-fourth of the possible total of sugar in the cane, as no analysis had ever been made to determine the point. As a matter of fact, personally, I have never seen any polariscopic tests of the cane juices, so as to determine the average percentage of sucrose, or sugar; but, given the density of the juice, experience in other countries determines for all practical purposes the proportion of sugar contained. As this item plays an important part in reaching a definite conclusion on our possibilities, I shall submit here the results of several years' tests made in Negros by an English sugar chemist, Mr. Crick, giving the average densities of juice in degrees Baumé for the different parts of the province during different months:

1. Northern Negros:
    November,—6° to 6.7° Baumé.
    December to end of crop (if very dry),—9° to 10°.
    Exceptional (hard cane,)—11.4°.
2. West Negros:
    November,—6.2° to 6.8°, improving to 9° to 9.7°; exception,—10°.
3. Central Negros:
    November,—7° to 8.5°, improving to 11°,
    Small patches in foothills give 11.5°.

Mr. Crick also furnished me with the following data on the yields of sugar per acre from his own observations:

Northern Negros.—Average yield, 1½ tons per acre. Maximum yield, on isolated patches, 2½ tons per acre.

Western Negros.—Average yield, 1¼ tons per acre. Maximum, 2½ tons per acre.

Central Negros.—Average yield, 1¾ tons per acre. Maximum, on foothills, 3 tons per acre.

And, while I am at it, I will also give the results of his polariscopic tests in Iloilo on the sugars resulting from the above crops. I may mention, incidentally, that Mr. Crick is the deputy collector of customs at Iloilo and the only person in town owning a polariscope. His results show that 80 per cent of the Negros sugars polarize from 70° to 79°; 10 per cent polarize from 79° to 84°; 10 per cent (superior grade, not polarized) sold on degree of dryness and color.

The tests of juice in Pampanga show a much lower density than in Negros, owing to the lands being low and improperly drained.

In Pampanga the official returns of the census give the average yield per acre as 1,100 pounds, while my own investigations fixed it at 12 piculs per balita, or acre, equivalent to 1,800 pounds. The process of manufacture is the old, crude, muscovado sugars, extracting about 50 per cent of the juice of the cane. This process at its best, under these primitive conditions, will return in sugar; about 5 per cent of the weight of the cane in Louisiana, with the same process, it is 4½ per cent. So it is readily seen that when only 1,500 pounds of sugar is secured per acre, or 5 per cent of the cane, the latter or yield per acre will be 15 tons, and 18 tons when 1,800 pounds are secured. This firmly established, what can be accomplished with a modern factory, securing an average of 10 per cent, or double the above, in Pampanga.

My attention has been called to the fact that in Negros a different method is employed in making sugar; that instead of draining the molasses from the cooked mass, as in Pampanga, it is boiled down to a point where, on cooling, there is no molasses secured, and therefore the average yield in weight of the cane is much higher or nearly double and my statement of 5 per cent should really be 10 per cent, and therefore the lands in Negros are now yielding in concrete sugars the same tonnage as they would with modern machinery. There is much truth about this phase of it, and taking all average conditions into consideration it might reasonably be stated that in Negros they are securing some 9 per cent instead of 5 per cent in sugars; but the grade of the sugars decrease in proportion. It could be readily proven just what the proportion is, and consequently instead of doubling the tonnage per acre by modern methods the crop would remain, the same, and the statement of the best people about the possibilities of our lands refuted. (Wiley.)

It may be said that the sugars of Negros approximate what is called in trade "concrete," owing to the molasses being boiled down with the grain, naturally increasing the weight or yield. They are sold, however, under the classification of muscovados, but the grade is so low that little of it is bought by the American refineries. The very low grade sugars, or below 80°, being so filled with impurities, ash, etc., are not handled by all refineries, and, as a matter of fact, the only refinery of the trust which refines this product is one located at Jersey City. There is such a preponderance of 96° sugars now made in the world that the refineries will not buy the very low grades, except to fill a limited demand for certain grades of sugar. The great bulk of the crude sugars of the West Indies finds its way to the Arcadia Refinery, at Halifax, for the Canadian trade.

This fact notably explains just why such a small proportion of the Philippine crop has come to this country, and just why the proportion can not be increased under the present methods of manufacture. Mr. de la Rama states that five-eighths of the crop in the Philippines is below 80°, two-eighths from 84° to 85°, and one-eighth from 87° to 88°, or a slight divergence from the proportions given by Mr. Crick, of the Iloilo customhouse. However, the point is clearly apparent that at least three-fourths of the Negros crop is of such a low polarization that it can not find a market in the United States, except at a very low price, and when we take the average polarization of 84°, as has been the case here in these hearings, this really represents only about one-fourth of the product, the balance being anywhere from there down to 70°. Now the trade discount on the market price of 89° test for each degree less is 0.1 cent down, so when muscovados—89° test—are quoted at 3⅛ cents, 84° sugars are worth 0.5, or ½, cent less, or 2⅝, and when we get down to a basis of 79° it is another ½ cent off, or 2⅛, and when down to 74° the price is 1⅝ cents, or a sugar without a value; that is, having no demand except in China and Japan.

The difference between the sugars of Pampanga and Negros can be better appreciated by the following example, based on a market value in New York of 3⅛ for 89° test:

In Pampanga the planter receives 5 pounds of sugar and about 5 pounds of molasses from his 100 pounds of cane, the sugar polarizing 89°, and worth, therefore, 15⅝ cents plus the value of the molasses for making rum, but it necessitates three to four months for the sugars to drain.

In Negros the planter receives 9 to 10 pounds of sugar from his 100 pounds of cane, polarizing from 88 to 74, with an average value of 2 cents per pound, or total of 18 to 20 cents for his product, and no molasses.

We find, therefore, that for each 100 pounds of sugar, instead of an average price of 2⅝ cents on 84° test, the real price to the Filipino duty, paid at New York, is as follows (on a value of 3⅛ 89° test):

10 per cent of 88°, at 0.03025	0 3025
10 per cent of 84°, at 0.02625	.2625
40 per cent of 79°, at 0.02125	.8500
40 per cent of 74°, at 0.01625	.6500
Average per 100 pounds	2.0650

So instead of an average of 2⅝ the real average is at least five-eighths of a cent less, or about 2 cents per pound, and it will help to explain just why the planters have been losing money. This may also demonstrate to this committee why so little of the Philippine sugars have come to this market, and why these low grades will not come in the future, and why they will go to China, where there is a demand for them.

It is a fact that the 30,000 or more tons now stored in New York has found no buyers, or it is possible it would have been sold long ago.

This point alone is proof positive that our exports to this market will not materially increase over the old standards, and any great increase must come from the 96° product of modern mills.

The statistics of exports from the Philippines from 1896 to 1905 show that out of a total tonnage of 1,182,364 exported from the islands 282,000 tons came to this country, or about 25 per cent, the balance going to the nearby markets. These figures are further proof that only 25 per cent of 84° to 88° grades are salable in the United States, and the 75 per cent of the lower grades find their inevitable outlet to the only countries where it is consumed in a crude state, where the lower the price the more acceptable the product.

So the doubling of our present crop and the exportation of it to this country is quite a formidable matter and must come from a great increase in the number of factories.

With the drained muscovado system in Pampanga the yield of cane per acre is roughly about 18 tons, and in Negros where they make concrete the yield may be estimated from 7 to 10 per cent on the weight of the cane, so that with modern methods the yield could not hope to double the present in tonnage, but would in value. We find in Negros that the average yield is 2,800 pounds of sugar per acre, which means 14 tons of cane to the acre, though in newer lands removed from the coast this average is about doubled to 30 piculs, or 5,000 pounds per acre, or 25 tons of cane, the world's average.

So in getting down to a basis for future work we can safely estimate the lands of the Philippines to yield an average of some 25 tons of cane and perhaps in the new land to rattoon for three or four years, placing us in the same relative position as Porto Rico.

Now, gentlemen, we have discussed this question from all its practical points, and have clearly demonstrated where the opposition is in error and their menace only a hallucination conjured up by their own brains, but in all my comparisons I have carefully avoided any reference to the existing margin of full-duty-paid sugars entering this market and fixing the price, basing my comparison of costs on the time when this margin and the greater margin of Cuban sugars are wiped out.

We have, according to last year's statistics, a margin of 438,000 tons of full-duty-paid sugars, to which must be added the accepted yearly ratio of increase in consumption of some 80,00 tons, or a margin of 510,000 tons of full-duty-paid sugars to work on for the year.

Now the point has been raised by the opposition that this 500,000 tons is fully taken care of this year by the estimated increase in production, but I submit, gentlemen, that an estimate figured out at the beginning of a crop or the commencement of a year seldom comes true, for there are innumerable conditions which can arise during the year to vary it. Early estimates, based on prospective plantings or possible yields are generally misleading, and crop statistics vary from week to week with weather conditions and other causes.

Last year, owing to abnormally high prices, the plantings for this year were unduly stimulated, but the market has since gone back to its normal condition, and this year with low prices the pendulum will swing back and the old order of affairs prevail. It is decidedly unfair to take such an estimate as one to base their argument on and hold that this year's increase will establish a new basis for supply. As a matter of fact the estimated increase for this year, as stated by Mr. Humphrey, is in direct contradiction to the statistics, for we find in Willett & Gray's circular as follows:

Sugar crop.

	1904-5.	1905-6.
United States (Louisiana and Texas)	350,000	312,000
Hawaii	380,000	370,000
Porto Rico	145,000	210,000
Cuba	1,163,258	1,300,000
Beet crop of United States	209,722	285,000
Total	2,247,980	2,477,000
		2,247,980
Increase, 1905-6		229,020

The consumption of sugar last year was lower than the previous year, owing to the high price, and it is only fair to assume that this year, with the lower price and increase in population, the consumption will swing back to that of 1904 plus the average ratio of increase, or 2,767,162 plus 80,000 plus 80,000, or a total of 2,927,162 tons. So that even with the high estimate of the increase in production of 2,477,000 there will still be a deficit of 450,000 tons to come from the Philippines and elsewhere. I think I have conclusively proven that only the average proportion of 25 per cent of the higher grade Filipino product will continue to come to this country, even under free trade, so that for several years at least it will not cut any figure. Now, it is plain to be seen that we have a margin of something like 400,000 tons of full-duty-paid sugars plus the annual increase of 80,000 tons to work on and develop before the present market values are affected. I have pointed out the difficulties existing in Hawaii and Louisiana, and stated why their development had reached its limit. The crop of Porto Rico may advance to 250,000 tons in a few years, but not until new factories are erected, and that takes time, and then that island will have reached the limit of its resources. Cuba will swing back until her labor question is settled, so the real fight to supply the 500,000 tons plus the annual ratio of increase of 125,000 to 150,000, which comes over the garden wall, will dwindle down to one between the beet and the Philippines. In the ordinary rate of progression, with the beet cost of production being steadily lowered and the cost in the Philippines steadily increasing, it will take several years before this margin is wiped out, several years yet before the average market price for refined will drop below the average of 4½ cents as maintained now by the refineries on the full-duty-paid sugars.

Then we get down to the basis of the 20 per cent reduction on Cuban sugars, and the price will be reduced 33 points accordingly, or a possible price of $4.17 per 100 pounds. This still gives a good profit to the beet, for by that time they will be making sugar at 3 cents per pound, and if they are not they have a hopeless case—they ought to get out of business. Now, in taking this view of the future, I assert it is simply a gamble, for the chances are 10 to 1 that when the Cuban reciprocity treaty comes up at the end of three years for renewal it will not be ratified, and instead of the price dropping 34 points it will remain at the old figure and bring the margin of full-duty-paid sugar up to over 1,500,000 tons for the home industries to expand in.

Now, again, as a matter of fact and common sense, so long as the refiners control the market and set the price there is no danger of the beet industry being wiped out, and one of the most remarkable incidents in these discussions is the open hostility and animosity voiced by the beet-sugar people against the refineries, whom they have every reason to bless for favors bestowed in the past and to receive in the future. The price of raw sugars can never get below the lowest cost of production and delivery at New York, which can be roughly taken at 2 cents, or the world price. Anything lower than this means the extinction of the tropical industry, for at a cost of 1.4 cents in Java, 2 cents in Cuba, 2 cents in Hawaii, 1¾ cents in Porto Rico, and the same in the Philippines, anything less means the ruination of the industry. To this 2 cents must be added the lowest duty, or the Cuban 20 per cent reduction, or 1.34 cents, making 3.34 cents. Add the refiner's cost to refine and his margin of profit, the difference being about $1, it brings the cost to $4.34 at New York, plus 49 cents to the Missouri River, or $4.83. This is the cheapest that refined cane sugar anywhere can come into competition with the beet, and is the price which prevails at present approximately. Any great lowering of this cost is impossible, without putting either the refiner or the cane-sugar producer out of business, and as long as there is a demand for refined cane sugar, so long will the beet people be under obligations to the refiner and his tropical brother farmer. And this will always be the case, for beet sugar can never wholly displace the cane, as it is not suitable for many purposes. I would like to read what Doctor Wiley had to say on this point before the Ways and Means Committee:

"The question of the relative character of the two sugars comes also into this discussion. 'Are they identical?' This is a question which has been asked me hundreds of times. I will say, in reply, that the pure sugar made from cane and made from beets is identical in every particular, but the raw sugars are wonderfully different in their composition; so it is only the absolutely pure sugars which can be regarded as identical. Therefore, although this table shows the rapid relative growth of the beet industry, it does not mean by any means that the beet industry can ever drive the sugar-cane industry out of existence, although a great many people calmly speak of the possibility of such an event in the future—that is, that the increase in the beet-sugar industry will be so great that the industry of making sugar from sugar cane will cease.

"There are, however, certain uses, based upon the properties of the two sugars, which can not be interchanged. For instance, for commercial purposes, for baking purposes, for preserving and other similar purposes, the raw beet sugar can never take the place of the cane sugar, for the reason that beet sugar in its unrefined state is scarcely fit for human consumption, either directly or in the cuisine.

"This is best illustrated by two samples which I have brought, such as are taken every day for polarization for the purpose of ascertaining the rate of duty to be imposed upon imported sugar. I wish the committee would simply open these two cans and smell each one, and you can then understand the force of my argument and understand why it is that a raw beet sugar can not be used for commercial purposes, while a raw cane sugar can be. So, for the great preserving industries, for making jams and jellies, and for baking cakes, where low-grade sugars are preferred, the beet sugar can never take the place of the cane sugar. Therefore, the cane sugar, in spite of this relative increase in magnitude of the two industries, can never be driven from the markets of the world.

"I will show, as the hearing proceeds what the cause of this remarkable increase is.

"Now, Mr Chairman, you might think that when you refined that article this difference would disappear. But I can tell you, and so can any expert in sugar, whether a refined granulated sugar is made from cane or whether it is made from beets.

"Mr. McClellan. Without analysis?"

"Doctor Willey. Without analysis. You simply need to place such a sugar in a jar, only partly filled, and stopper it for twenty-four hours. Take a perfectly white sugar, polarizing almost 100, made from beets. Place it in a jar, stopper it for twenty-four hours, take out the stopper and smell it. This odor, like the odor of the roses in the broken vase, 'will hang round it still,' even in the refined state, as it is sold in commerce."

If it were not for this difference in quality between the beet and the refined cane products, which prohibits the use of the former in many instances, the beet product would ultimately control the situation and dictate the prices or force them down so that the latter would have to go out of business. The parting of the road has already passed, for the cost of producing refined beet sugar is already so low that the refiners can not compete with them at the Missouri River. It has been clearly demonstrated that in many instances the beet cost is less than 3¾ cents, while the raw cane product is worth, duty paid, 3.625, to which add the refiner's cost of 0.625, and we have 4¼, without profits or freight charges. As the beet cost declines and cane increases this variance will be greater, and the beet manufacturers will displace the refined cane in all but the Atlantic seaboard and yet continue to take advantage of the market as made by the trust.

When the beet cost is lowered to less than 3 cents their product will soon find its full market and increase accordingly, and while taking advantage of the New York market in price will so regulate it to undersell it by the difference in freight to various centers.

So the field is here for both of us, and as the beet-sugar farmer and manufacturer, under the stimulus of governmental help and direction, continue to better the product of their beets, as with new methods they reduce their manufacturing expenses and ultimately their costs, until they reach the golden era of 2 cents, they can bless the refiner and the cane people, who are holding up the market for them to over 4½ cents.

As Mr. Saylor, the Government sugar expert, so aptly stated in his testimony on the Cuban reciprocity treaty (pp. 533-534)—

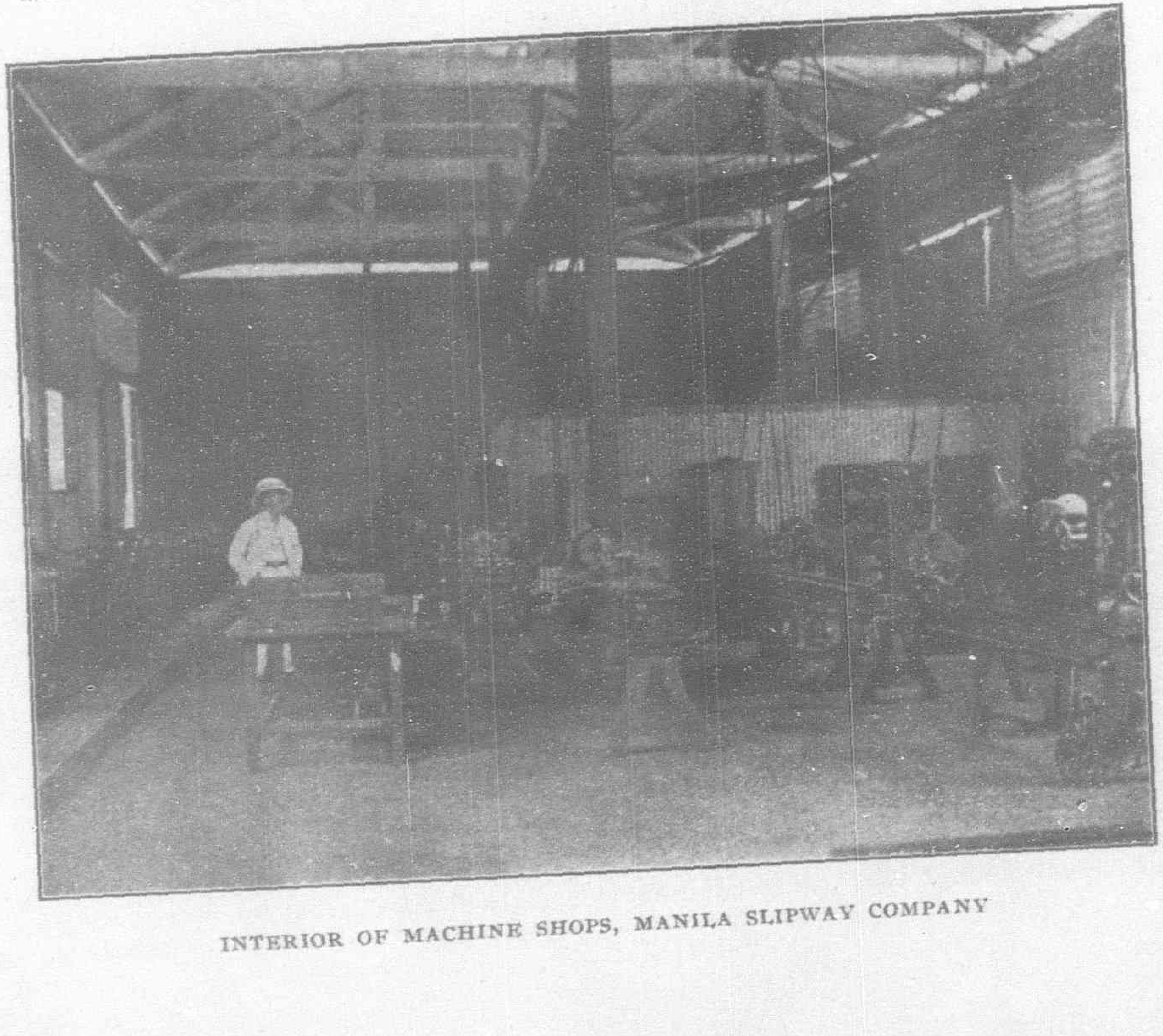
> There is no doubt that the costs will be equalized. It is working to that point. There is no doubt but that it will have both effects—that our cost (meaning the beet) will go down as we become more effective in our work and methods and in understanding our conditions, and their cost (referring to tropical cane) will come up by reason of paying higher wages.

Gentlemen, I thank you for the indulgence shown in listening to my argument, and in conclusion I once more appeal to you to consider this question from its merits, feeling sure that an impartial study of the facts will decide the matter in our favor. Give us a chance in those far-away islands and we will develop them; we will in time repay to the country the millions spent in trying to improve them. We have out there the same type of Americans who built up the great West for you. Call them adventurers if you like, but they are the same old stock which made the expansion of our country possible. In company with the native, all they ask is the only thing one American can ask and expect to receive from another—a fair and equal chance. Don't discriminate against us. Don't tie our hands, but give us an opportunity—give us fair play. Give us a square deal, and we will do the rest.

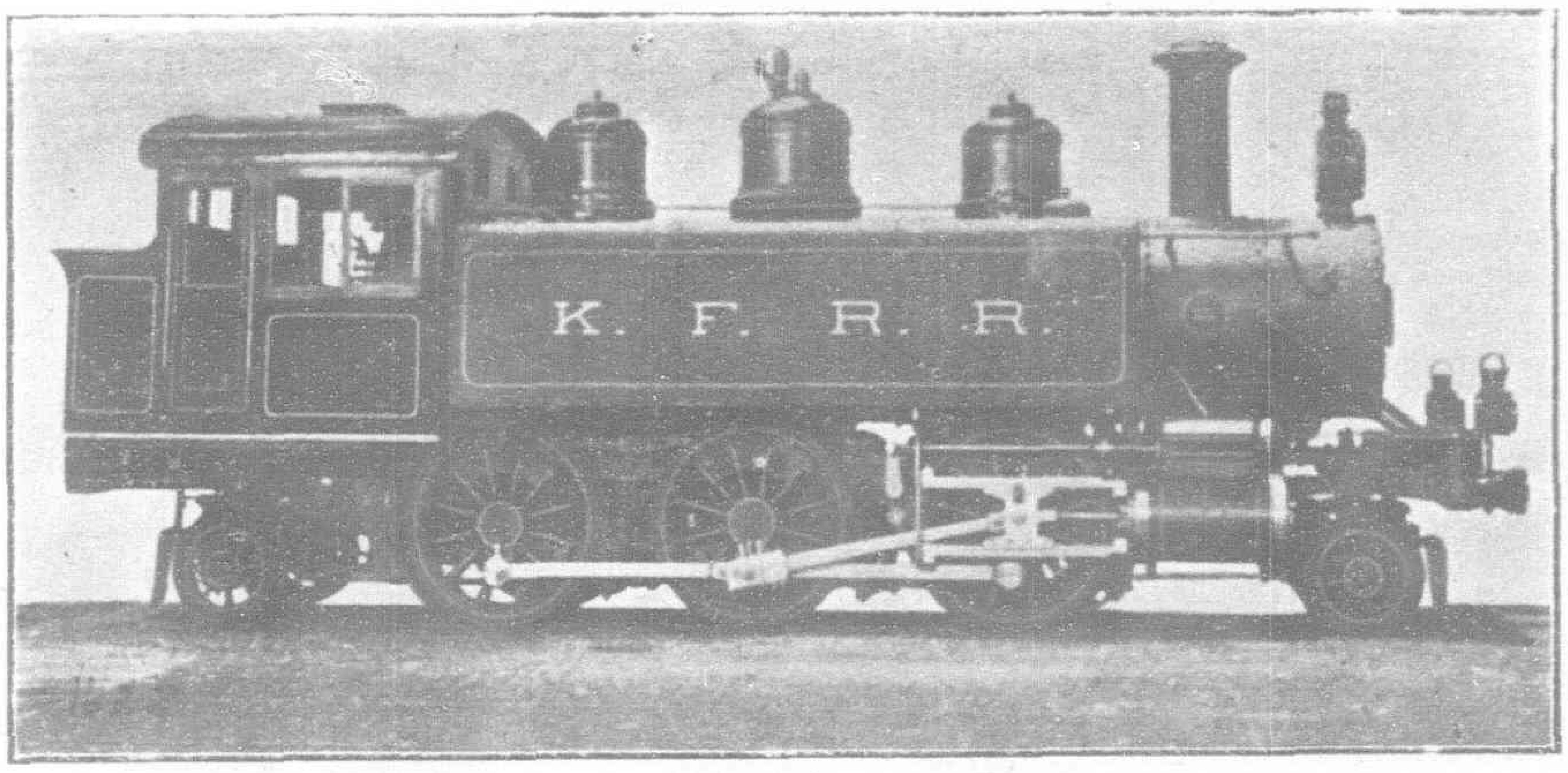
DEVELOPMENT OF SANDAKAN

Years ago our geography books told us that England's capital city was London, also that Birmingham was a large and prosperous city. Since that time Birmingham has become a much larger and more prosperous city, but London still remains old England's capital, and when many other cities have sprung up and become great, London has never worried herself; she has just gone on making herself even more and more beautiful, and has steadily helped those other cities to become great and prosperous, without robbing herself of one iota of her own greatness; and so in a very small way with us here. To those of us who have been away from Sandakan, and not seen her for the last two or three years, the advancement and improvements everywhere are remarkable. We who have had the opportunity of watching the rapid growth of our West Coast town, Jesselton, and have seen the gradually increasing trade opened up by the Railway, which will in the near future make her, too, a much larger and more prosperous town, are more than gratified to find that Sandakan has not looked to her laurels in vain: far from it, she is even more beautiful than ever before. To specify a few of the more marked improvements we must begin at the Wharf, where we find a new Office for the Superintendent of Customs, think what a relief it must be to get away from the old one and its close proximity to the boxes of "ikan kring." Then on into the Chinese town, and we find it cleaner and better looked after than ever before, several new blocks of shops, and more in builders' hands; the Gambling Farm as crowded as ever, a sure sign of prosperity; a better class of goods in the old established shops, but breathe it not, at the same old prices! We well remember this rate of exchange which knoweth not fluctuation! On passing from the town we find the Post and Telegraph Offices in new quarters, a very smart and business-like building, then on to the Printing Office, transferred (not to the Museum) but to the building once used for it, which seems to give ample space for the increased staff and output; on towards Fort Pryer, where we come across Messrs. The China Borneo Co.'s Slipway, a boon to our own as well as our neighbors' shipping, which occupies the land and foreshore which was formerly the resting place of the flotsam and jetsam of Sandakan town, until we arrive at the Eastern Barracks, an entirely new building and an enormous improvement on the old one. On our way back the roads call for mention, in fact the roads everywhere have been graded and widened, corners cut off and the old washouts properly drained. The exterior of the Church looks practically finished and we hear that as soon as the windows are in, the old building inside, over which the nave proper has been built, will be removed, and expose to our view what we know to be a great ambition—a Stone Church in Borneo—the dogged progresss of the Church calls for our great admiration of a set purpose. No appreciation of Sandakan would be complete without noting what to us is the new Government House, lying in its beautiful grounds, in which it is easy to detect the hand of the expert gardener. We might mention many more actual improvements, but the foregoing show quite clearly Sandakan has made big strides forward in beautifying herself. She need never fear rivals to her claims to be the first town of British North Borneo, however successful or prosperous her sister towns may become. We wish them the success and prosperity she herself enjoys.

(British North Borneo Herald.)



INTERIOR OF MACHINE SHOPS, MANILA SLIPWAY COMPANY



TYPE OF AMERICAN LOCOMOTIVE IN USE ON THE SEOUL-FUSAN RAILWAY. BUILT BY THE BALDWIN LOCOMOTIVE WORKS

RAILROAD NEWS

SWATOW CHAO-CHOU-FU RAILWAY:—The railway which is to connect Swatow with Chao-chou-fu, the concession for which was given in December, 1903, to one Chang-yu-nan, a Chinese merchant, who has for many years been resident in the Dutch Indies, has not advanced as quickly as was hoped, owing mainly to the great difficulty the railway company has experienced in purchasing land. After the settlement of the Am-pou riot, in which early in 1905, two Japanese workmen were killed, work on the railway was again delayed by the opposition of the local gentry and merchants, who alleged that the proposed line of route threatened injury to existing water rights. The protest was supported by the villagers, the prices offered by the railway company for the land, based on the Luchan Railway regulations, not being considered adequate. The question was investigated by the Taotai and a Commissioner from the Board of Commerce, who decided that the complaint as to the injury to water rights was frivolous, but recommended an advance of about fifty per cent. in the prices to be given for the land. This compromise seems to have been satisfactory, and since August work has been proceeding more rapidly. An embankment has been made, and rails laid down as far as Ampou, a distance of about ten miles. The total length of the line will be thirty-two miles, and there are to be seven intermediate stations.

All material for the railway is supplied by the Japanese contractors, who have not offered any public tenders. The Japanese contractors for the railway are making a sad muddle of the work, and the shareholders are already beginning to question whether, when the accounts are squared up, the actual expenditure will be below the estimate of the English firm which was first talked of in connection with it.

THE PEKING-KALGAN RAILWAY:—Work on the Peking-Kalgan railway is progressing very rapidly under the charge of Taotai Chan, an American educated civil engineer, and it is expected that the whole line will be completed before the close of the year 1907 instead of 1908, as at first contemplated. Viceroy Yuan Shih-kai wishes it finished and opened to traffic as soon as possible with a view of having it extended to the Mongolian capital or Urga and beyond as far as the Siberian frontier. All the railway materials ordered from France have arrived at Tientsin and have been delivered to the railway administration which is under the directorship of Taotai Cheng. No foreigners are employed on this line.

KIANGSU RAILWAY CO:—The formation of the Kiangsu Railway Company, in connection with which a meeting was held on the 10th of June at Shanghai, has been made public. H. E. Wang Tsing-nur, Vice-President of the Board of Commerce, has been appointed the Director-General, and Mr. Chang Chong the Chief Adviser, of the same Board, as Director. The capital is ten million dollars, of which two million was subscribed at that meeting. The Company are to build railways throughout Kiangsu Province, but as a preliminary step the sections between Soochow and Kashing and subsequently Kashing and Shanghai are to be constructed.

SOOCHOW-NINGPO RAILWAY:—It is stated that the British Chargé d'Affaires is still working energetically concerning the Soochow-Ningpo railway concession, as the British and Chinese Corporation is desirous of connecting it with the Shanghai-Nanking Railway. A representative of the said Corporation has informed the Peking Government that if the line is built by his Corporation China can get it back in fifteen years, but if it is to be built by the Chekiang merchants, it will not be completed in thirty years.

FUKIEN RAILWAY:—Chen Pao-sin, a prominent resident of Fukien, who was appointed to manage the Fukien Railway, recently engaged two French engineers who are now surveying the road. The Japanese Minister at Peking has lodged a representation with the Waiwupu declaring that the construction of railways and opening of mines in Fukien ought to be done in consultation with Japan since China agreed that Fukien Province should not be ceded to any other country, and Japan's rights in arbitrarily engaging French engineers had been disregarded.

THE SANYO RAILWAY CO. held a general meeting in Kobe on April 28th. The net profit for the last half of 1905 was *yen* 1,528,408.16 to which a balance of *yen* 961,241.48, brought forward from the previous account, was added, making a total of *yen* 2,489,649.64. Of this sum, *yen* 76,500 was put to reserve, *yen* 13,500 was paid to employees as a bonus; *yen* 1,642,500 as a dividend at the rate of 10 per cent. per annum; and the remainder was carried forward to next account.

SEOUL-FUSAN RAILWAY:—It is officially announced that the State purchase of the Seoul-Fusan Railway will be effected on the 1st of July. This transaction will represent, it is believed, the only action which the Government will take during the present year under the provisions of the State-Purchase Law.

RAILWAYS IN KOREA.—The tunnel on the Seoul-Wiji railway at Chayuryong was completely finished on May 24th. The reconstruction of this line is gradually proceeding and will include a bridge over the Yalu River and the alteration of the gauge of the railway connecting Antung with Mukden to conform with the Korean railroads.

The light railway which is to connect Hamheung with the coast is also being completed.

TENGHYUEH YUNNAN LINE:—Exception is now being taken by the Chinese to the construction of the Burmah-Yunnan line by the British, and absurd petitions have been sent in from some quarters to the effect that the Chinese will build the line themselves. The Viceroy, however, is of the opinion that the utilization of British capital is all right providing a time limit be strictly fixed for the foreign control of the line.

SHANTUNG RAILWAY CO:—The traffic on the Shantung railway is gradually developing, and the daily earnings are increasing. The report for last year shows a very satisfactory state of affairs, the railway being able to pay, notwithstanding very heavy expenses a dividend of three and a quarter per cent., an increase of one per cent. over the previous year.

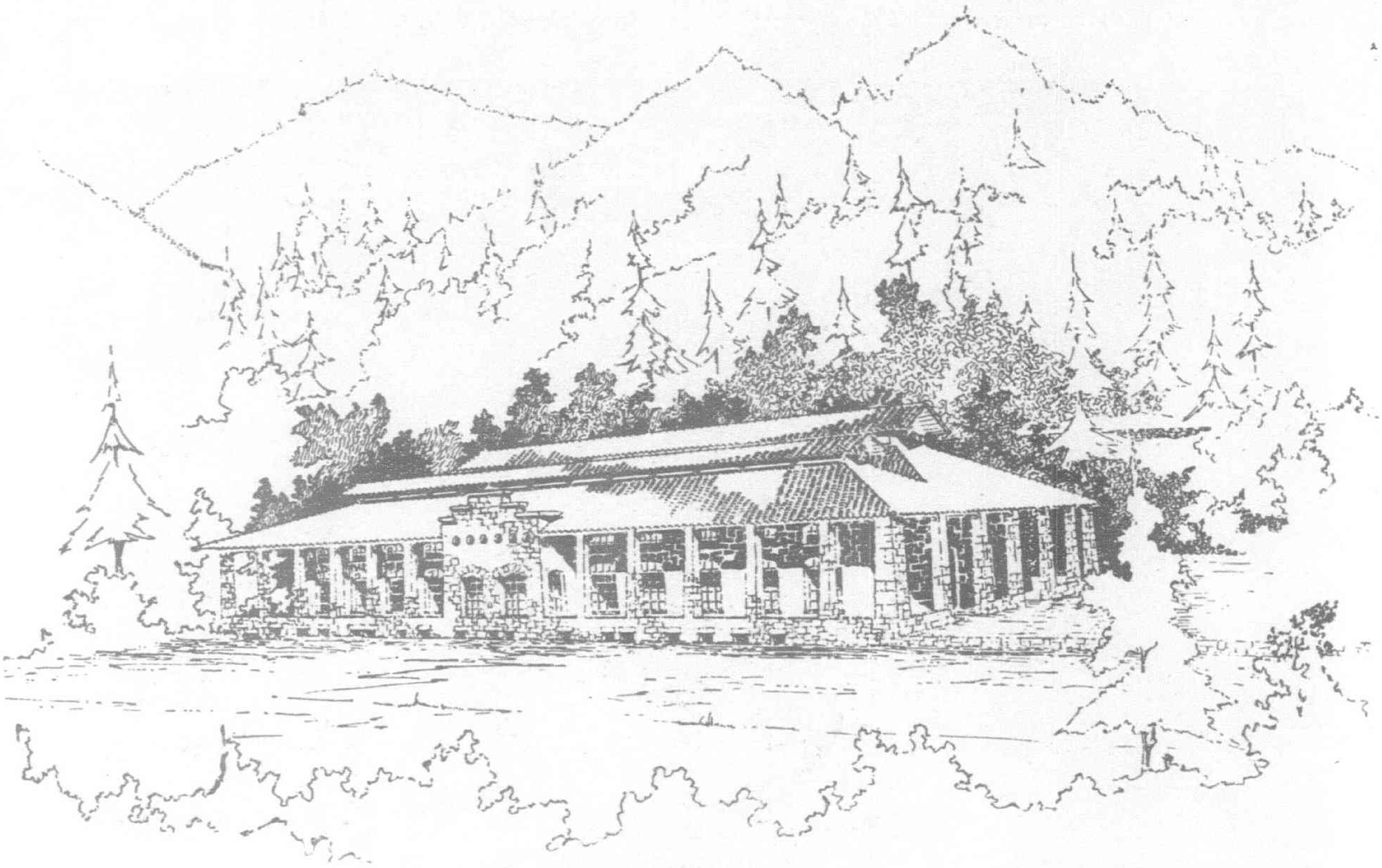
SINGAPORE-KRANJI RAILWAY:—The earnings of the Singapore-Kranji Railway during April amounted to $16,883.55 against $22,115.72 for the corresponding period of last year. The total receipts for the first four months of the year compare unfavourably with that obtained during a similar period of the previous year.

THE FAT SHAN RAILWAY:—The section of the Yuet Han Railway, from Canton to Fatshan, seems to have deteriorated from bad to worse since it was handed back by the Americans to China. Some of the railway stations along the line are built of bamboo, and are the resort of gamblers and opium smokers.

MANCHURIAN RAILWAYS:—Over sixty-four miles of the Chinese Eastern Railway between Changtu and Kungchulin were delivered to the Japanese Commission, headed by Major-General Nakamura, on the 1st of June.

INDIAN RAILWAY PURCHASE:—Final arrangements for the Kalka-Simla Railway purchase by the Government of India for £300,000 are now being made by the Secretary of State.

JHELUM RIVER HYDRO-ELECTRIC POWER INSTALLATION IN BRITISH INDIA



PROPOSED GENERATING STATION FOR THE JHELUM RIVER POWER TRANSMISSION SCHEME.

The government of British India has for some time pursued a broad-minded policy in developing the latent possibilities of the immense and valuable country over which it exercises sovereignty, and its officials have interested themselves in providing for the future welfare and enlightenment of the native inhabitants. Among other laudable projects, which the Government has instituted, has been the commissioning of some of the most capable Royal Engineers to plan for and construct public works, such as would aid in the general advancement of the native industries and the development of the commerce of the country.

The first notable project undertaken for the generation and distribution of electricity was that of the Cauvery Power Scheme, located in Mysore State in Southern India. Work on this plant was started in 1900, the initial installation being completed after many difficulties in June 1902. About a year ago, the second installation or extension of the plant, consisting of 3610 kilowatts generator capacity, was completed. This increased the possible output of the entire plant to 7920 kw, making it the largest hydroelectric installation now operating in Southern Asia, if not on the entire continent.

The chief credit for the completion of the Cauvery Power Plant is due to Major A. J. de Lotbiniere, R. E., Deputy Chief Engineer of the Government of Mysore, who not only conceived the plan of the installation, but successfully arranged for the financing of the entire project, overcoming prejudices that would have deterred a man less sound in his convictions. He afterwards arranged for the purchase of the entire electrical and hydraulic equipment and supervised its installation.

The power scheme next to be undertaken after the Cauvery is the Jhelum Power Installation on the Jhelum River in Kashmir, in Northwest India. This power plant is to be installed near Rampur about 50 miles below Srinager, where a 6-mile conduit will give a head of water at the plant of about 400 feet. The present plans call for an installation of about 20,000 horsepower.

It is planned to use the power for operating the Kashmir section of the Jhelum Valley Railway electrically along its entire length of 180 miles. A single-phase system of traction will undoubtedly be installed. Possibly the most important immediate use to which the power will be put will be in operating dredgers for the purpose of deepening the Jhelum River in the Kashmir Valley, and thus minimizing the floods, which, under existing circumstances, periodically devastate the entire country. The contemplated plant will also allow of the reclamation of a very large tract of land, and permit of the storage of water in Wular Lake above the power plant for sale to the Punjab Irrigation Department. Another important use of the power will be for operating the large silk factory at Srinager and also for supplying with current the electrical water heaters in the silk mill. In addition, the power will be utilized for other industrial purposes and for lighting in Srinager and in Abbottabad, Murree and Rawalpindi, prosperous towns in the British Province of Hazara, lying to the west of Kashmir.

After successfully completing the preliminary arrangement for carrying on the important work connected with the Jhelum Power Installation, Major de Lotbiniere was instructed last May, by the Jammu and Kashmir State Council, acting for the Maharajah of Jammu and Kashmir, to proceed to Europe and America in order to interview the leading hydraulic and electrical manufacturers and to ask those selected to bid upon the machinery and materials for the plant. Carrying out these instructions, he visited the works of those leading manufacturers on both continents who were considered for the work and personally inspected their manufacturing establishments, as well as power plants in which their machinery was operating.

As a result of this careful investigation, Major de Lotbiniere, who had full powers for the acceptance of the tenders submitted, has recommended to his Government that the contracts for the entire hydraulic and electrical equipment be placed with firms in the United States. The contract for the hydraulic equipment was awarded to the Abner Doble Company of San Francisco, U. S. A., and calls for the hydraulic plant complete from the forebay to the tailrace, including the intake, valves, pressure pipes, pressure-pipe thrust blocks, interior piping, water wheels and nozzles, hydraulic governors, and all details necessary for the hydraulic equipment. The apparatus and materials are to be delivered at the port of Karachi, India.

The gravity conduit line for the power plant will be approximately 34,000 feet in length and for the upper 8500 feet will consist of an excavated ditch lined with masonry. The remaining portion of the water channel will consist of a rectangular flume, or a wooden stave pipe such as has been installed so successfully in connection with plants of this character on the Pacific Coast. The flume will have a capacity of over 500 cubic feet per second.

The forebay at the end of the gravity line and at the head of the pressure pipes will be constructed of masonry and will be provided with special headgates. The sliding elements of the intake gates will be of timber, all iron and metal parts necessary for the construction of the gates being furnished by the hydraulic contractor.

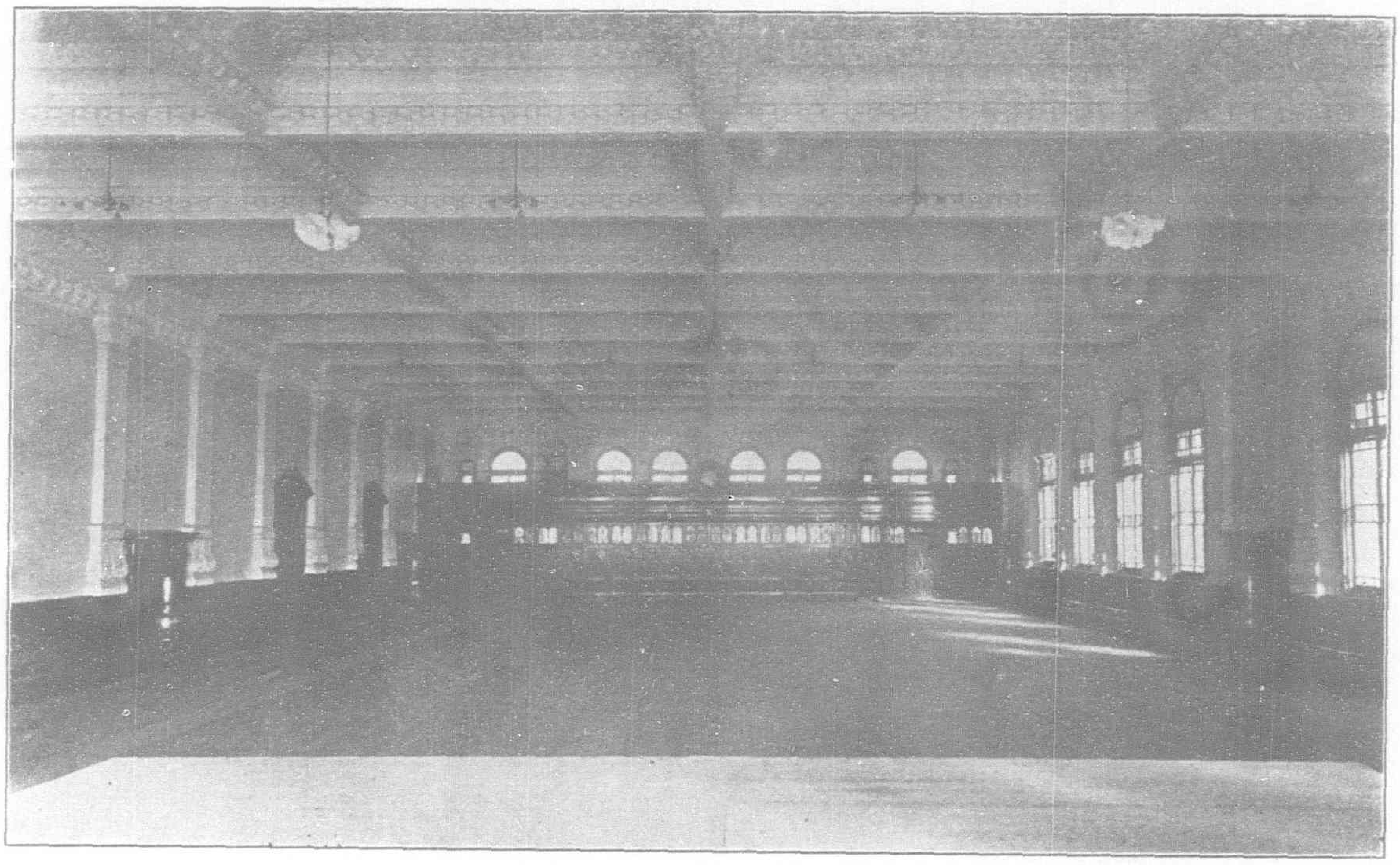
The pressure lines will consist of riveted steel pipes designed with a factor of safety of five, each supplying one of the hydroelectric units. For each pipe line a standpipe and two special vacuum valves will be provided in order to protect the pipe against injury in case the water should be drawn out suddenly.

At the lower end of each pressure line the last length of pipe will terminate in a flange which will be bolted to a massive cast-iron thrust block that will rest on a heavy cast-iron sole plate or base. The latter will be mounted on a substantial masonry foundation and held in position by anchor bolts. This fitting will be designed to take the entire hydraulic thrust of the pipe, an ample factor of safety being allowed so that under the most severe conditions there will be no strain on the branch piping in the interior of the power house. Each pressure line will consist of a riveted steel pipe varying in diameter from 30 to 36 inches and a 54 to 56-inch taper

(Continued on page 68.)

SHANGHAI MUNICIPAL PUBLIC WORKS

Extracts from Report of C. Mayne, C. E., Municipal Engineer and Surveyor



TOWN HALL (160′×80′)

I beg to submit my seventeenth Annual Report for the year ended 31st December 1905.

During my absence on leave from June 12th to December 4th the Assistant Engineer, Mr. C. H. Godfrey, was in charge of the Department.

The total Expenditure authorized in the Budget for new and maintenance works was Tls. 762,493, and the actual expenditure has amounted to Tls. 713,410, as against Tls. 817,287 in 1904 and Tls. 1,093,464 in 1903.

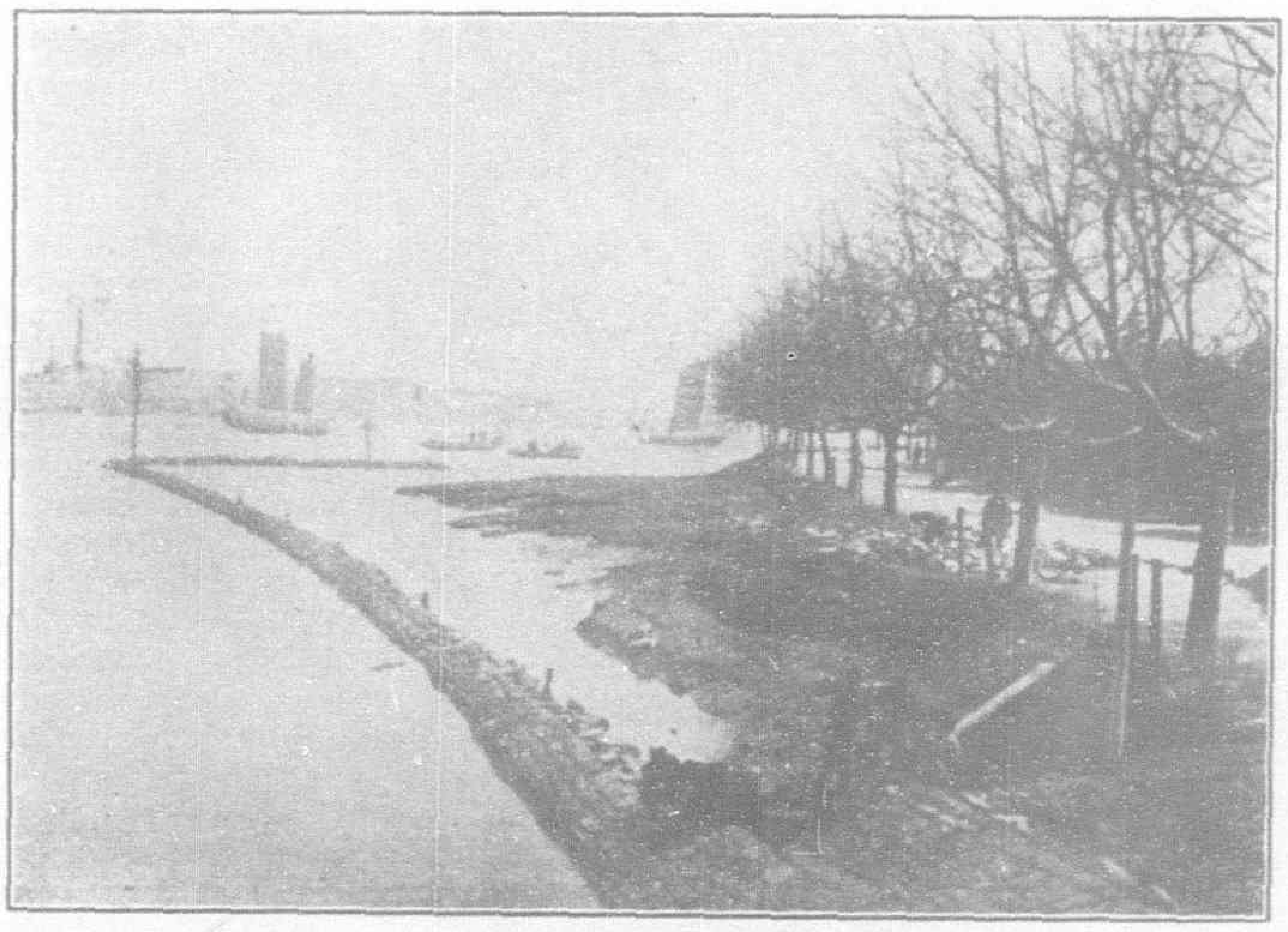
The most important works completed during the year were the Sinza Police Station, Public Garden Reclamation, Markham Road Bridge (cost defrayed by private individuals), the erection of a coffered ceiling in the large room of the Town Hall (160′ 0″ × 80′ 0″), the widening of the Bund from the Public Gardens and the putting through of Ward Road 50 feet wide from Alcock Road to the Yangtszepoo Creek, a distance of over 1¼ miles. The land for a new road (to be known as Edinburgh Road) from Siccawei to Jessfield has also been acquired.

One of the greatest improvements which has been carried out in Shanghai for some years is the reclamation on the north of the Public Gardens, whereby 5½ mow of land has been added to the grounds, which have latterly proved too small for the crowds which assemble there on band nights. The whole of the work was done departmentally at a cost of Tls. 11,300, just less than half the price submitted by the lowest contractor. The whole of the mud for raising (about 40,000 tons) was taken from the Soochow Creek, and the navigable channel has been very much improved thereby. It is satisfactory to note that although the work was only just completed when the typhoon and heavy floods of the 1st of September came, it did not sustain the slightest damage.

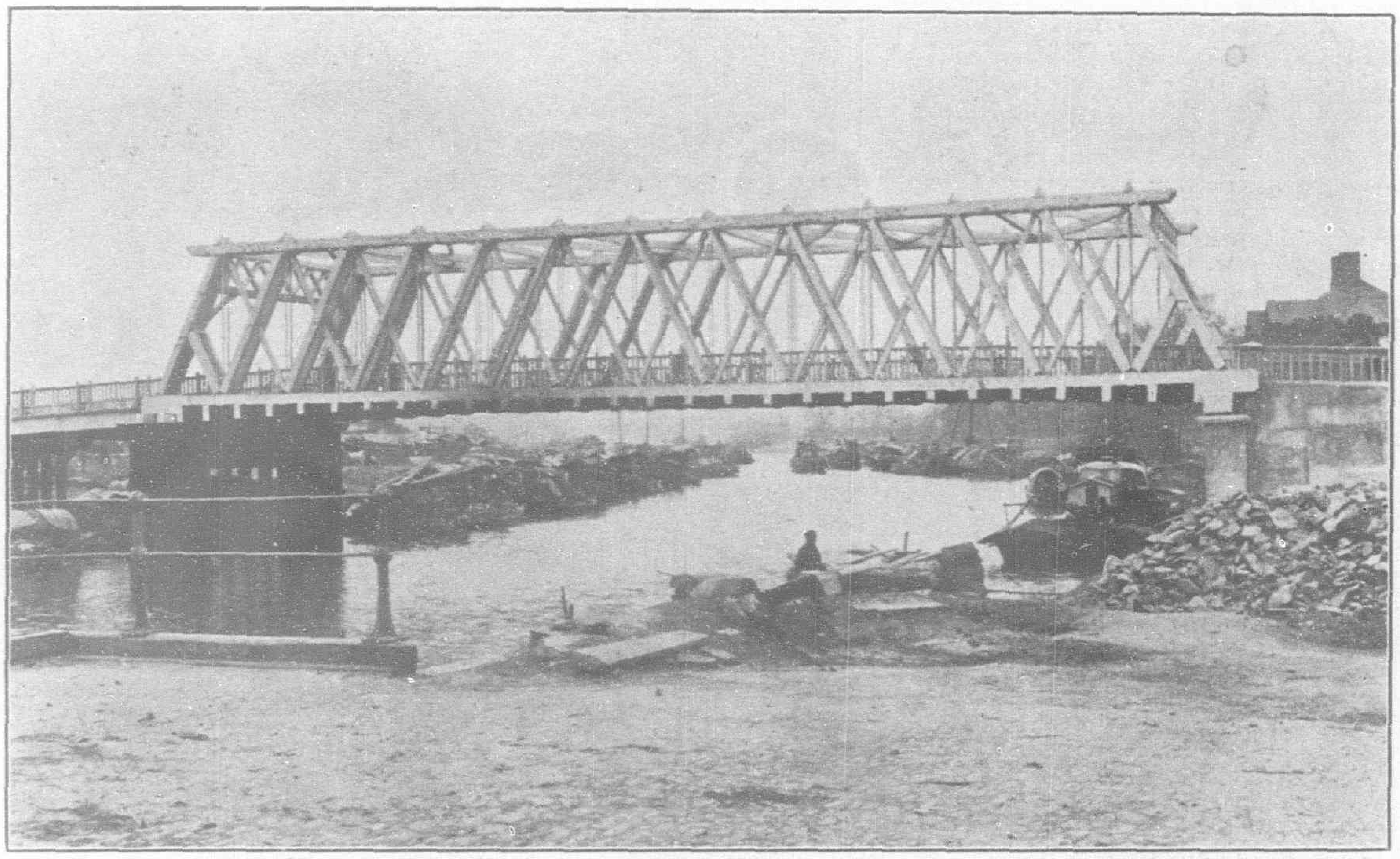
After several months' delay it has now been decided to call for tenders for a new Garden Bridge, sixty feet wide, having one clear span of 165 feet over the fairway on the south side and three smaller spans on the Hongkew side. Tenders are also to be invited for a new steel bridge over the Soochow Creek at Chekiang Road. This will be 40 feet wide with a span of 192 feet. Provision is also made in the Budget for the erection of a new steel bridge at Kiangse Road.

In order to supply intending contractors with as reliable information as possible with regard to the foundation on which the abutments of these bridges will have to rest, it was decided to sink trial holes to ascertain the nature of the strata. Holes 3½″ diameter were accordingly put down on the sites of the various bridges, four to a depth of 200 feet and three to 100 feet. The result, as was anticipated, showed that no firm foundation could be relied upon and that any structure to be erected must rest on a bed of alluvial deposit of a treacherous nature. Mr. T. W. Kingsmill, an authority on such matters, describes the soil as "a water-logged, highly micaceous sand of extreme fineness and of alluvial deposit and generally under pressure with no more consistency than a quicksand."

PUBLIC GARDEN RECLAMATION (Completed)



PUBLIC GARDEN RECLAMATION (In Progress)



MARKHAM ROAD BRIDGE (Main Span 104′)

The samples obtained from various depths at each boring have been preserved.

BRIDGES.—The total number of bridges in charge of the Department is 68 (including those over the Hongkew Creek and Saw Gin Kiang erected by the Land Investment Company).

A new wooden truss bridge has been constructed across the Soochow Creek at Markham Road. The main span is 105 feet, and the width 25 feet. The abutment on the south side is of cement concrete below low water level.

Two hardwood bridges have been erected by the Land Investment Company, one across the Hongkew Creek and the other across the Saw Gin Kiang. The Council has arranged to pay one-third of the cost of these bridges.

A new hardwood bridge 100 ft. in length and 30 feet wide has been constructed across the Hongkew Creek at Scott Road.

Considerable repairs have been made to the Garden Bridge, nearly the whole of the decking having been renewed. Many of the piles and other portions of timber are becoming very much worn.

Extensive repairs have also been carried out to the Honan, Shanse, Chekiang, Clatter and Stone Bridges.

BUILDINGS.—*Sinza Police Station.*—This station has been erected on a site fronting the Avenue Road and comprises the following buildings:—Main block for foreigners, Indians' quarters, native quarters, stabling and prisoners' cells.

The buildings are of grey brick with red brick dressings and a sparing use of green Ningpo stone. Roofs are of corrugated iron.

No boundary walls have as yet been erected owing to the Council's intention of building a new Fire Station on that part of the site directly fronting Avenue Road.

The cost of the building, exclusive of road-making, etc., has been Taels 40,000.

Town Hall.—In response to the crying need for bettering the acoustic properties of the large Assembly Room, a new coffered plaster ceiling has been successfully erected at the level of the old tie-beams, thereby obliterating the view of the unsightly roof-trusses and greatly improving the room in every way. By way of counteracting any misgivings as to the suitability of the old roof-beams to carry the heavy extra weight imposed (not less than 80 tons over all), one of the trusses was carefully tested by suspending a platform loaded gradually with bricks until a maximum weight of 7 tons was equally distributed along the tie-beam without any deflexion whatever taking place. The whole work was smartly carried out by contract and was completed in 8 weeks in readiness for the St. George's Ball, being four weeks before the date stipulated in the agreement, the total cost being Taels 6,000. A detachable and removable raised platform 24′ × 26′ and 4′ high has been provided for the use of the Band consisting of sixteen skeleton tables of such a size as to pack away one inside another when not in use. The front is of panelled work and the platform may be erected in whole or part as occasion requires. The cost was Taels 510.

Carter Road Police Station.—The old Bungalow and adjoining Indians' quarters have been generally remodelled and renovated, the cost including repainting and electric light and bells was Taels 1,400.

BUNDINGS.—*Soochow Creek.*—A section of concrete bunding between North Fokien and North Chekiang Road Bridges is now in course of construction. Another section between Woosung and Chapoo Roads is also nearing completion. With the completion of the present work there will be a continuous concrete bunding from Thibet to Fokien Roads on both sides of the Soochow Creek.

Lay Road.—Owing to the continual scour of the bed of Yangtszepoo Creek in the vicinity of Yangtszepoo Bridge and to the force of the current during the typhoon last September a portion of the bunding in Lay Road immediately north of the Bridge subsided; this has now been remedied by the construction of a new hardwood bunding of larger dimensions than the old. This bunding has been erected to the scheduled line of Lay Road.

The typhoon was also responsible for washing away a portion of the embankment and road at the Point. This has now been repaired. A bamboo bunding together with four bamboo groynes has been constructed with a view to encouraging the deposit mud at this point, in order to give more protection to the existing bank.

Bund Foreshore.—The whole of the Bund foreshore is being protected with a stone slope, a portion between Peking Road and the P. & O. jetty and another portion between Kiukiang Road and Hankow Road being completed; the whole section from Peking to Hankow Road will be finished in about six weeks.

Hongkew Creek.—The wooden bundings on the Hongkew Creek between the River and Yuhang Road have been repaired and new piles put in where necessary.

North Yangtsze Road.—The North Yangtsze Road wooden bunding has been repaired and renewed for a length of about 300 feet.

Yangkingpang.—The bundings on the Yangkingpang and Defence Creek have received attention during the year, although no extensive repairs have been made.

CREEKS AND RIVER.—*Soochow Creek* has been dredged in front of the Thibet and Kansuh Road Garbage chutes, and 3,484 tons of mud removed. This creek was also dredged near the Fokien Road Bridge for the Health Department, 3,425 tons of mud being removed.

Hongkew Creek in front of the Seward Road Garbage chute has been dredged and 1,258 tons of mud removed.

Defence Creek.—12,950 tons of mud and refuse was removed from Defence Creek during the year at a cost of Tls. 0.15 per ton. The work was done by means of small boats, each carrying about 6 tons, which were loaded at low water and moved off, with their loads, when the tide rose high enough to float them.

The cost of collection and removal of garbage from the streets and barging it away, averages about Tls. 0.37 per ton. The cost of removing mud and refuse from a navigable creek is therefore less than half the cost of collection and removal of refuse from the streets. The silting of Creeks such as Defence Creek, Yangkingpang and Hongkew Creek, is chiefly due to the depositing of garbage therein by the natives, a practice almost impossible to stop, but which need not cause anxiety seeing that the silting can be remedied so cheaply.

PINGCHIAO QUARRY.—*Quarrying.*—2,140 tons of good rock have been quarried from the small hill and 30,263 tons of good stone and 617 tons of rotten stone have been blasted from the large hill, in addition to 4,623 tons of decomposed sand. The rotten stone has been taken to the refuse heap. The handling and getting out of decomposed sand is becoming more and more expensive as we advance up the hill and I think in the near future it will be necessary to obtain a new sand quarry elsewhere. A great deal of stripping has been done, the earth being used for raising the quarry floor, which is now on a level with the "Gates" Crusher platform. The quarry is now in a position to turn out large quantities of material.

JHELUM RIVER HYDRO-ELECTRIC POWER INSTALLATION

(Continued from page 65.)

pipe, 10 feet long, at the upper end. The pipes will be 790 feet in length and will deliver the water under an effective head of 400 feet.

The interior piping of the power house will consist of welded pipe with welded flanges, all piping and fittings beyond the thrust block being designed with a factor of safety of 10 and subjected to a test pressure of 1½ times the working pressure for a period of five hours.

Twelve main units and three exciter units have been planned for the equipment of the power house. Each main unit will consist of a Doble Tangential Water Wheel with automatic oil-pressure governor delivering 1765 brake horsepower to the shaft, under an effective head of 400 feet. Each wheel will be direct connected to a 1000-Kw alternator, the speed of the unit being 500 revolutions per minute. The exciter units will each consist of a Doble Tangential Water Wheel delivering 285 brake horsepower to the shaft under an effective head of 400 feet. The speed of the exciters will also be 500 revolutions per minute.

The hydro-electric units will be of the Doble standard two-bearing type, the wheel runner being fastened on the end of the shaft. For each of the main units the Doble Company will furnish a high carbon, open-hearth steel forged shaft and two bearings of a special ring-oiling type provided with revolvable bearing shells. The exciter water-wheel runners will be mounted on the extended ends of the exciter generator shafts.

The water wheels will be equipped with ellipsoidal buckets, needle regulating nozzles and centrifugal water guards. The regulation of the main units will be effected by means of hydraulic governors operating jet deflectors. For the exciter units hand regulation will be provided by means of the needle nozzles. The gate valves for each wheel will be of special construction with outside screw and yoke, bronze-mounted, with by-pass.

The power house will be of solid masonry construction and will have a wide veranda as a protection from the tropical sun. A double steel roof will be provided and two travelling cranes will be installed for handling the machinery. The transformers will be installed in a bay of the main building or in a separate structure.

The conditions under which the plant will be installed are decidedly out of the ordinary as compared with similar work in this country. The specifications for the electrical and hydraulic equipment stipulated that no single piece of machinery should weigh more than four tons when packed, for the reason that there is 200 miles of road transportation, including a lift over a range of mountains 8000 feet high. Transportation in that section of the country is limited to bullock cart, and no single piece of machinery heavier than 4 tons can be transported, a total of 5 tons including the trollie (cart) being the maximum weight that can be hauled over the mountains.

Portland cement costs $7.50 per barrel delivered at the site, making its use prohibitive for heavy concrete work. However, there is plenty of natural rock in the vicinity, so masonry construction will be used for the walls of the power house and for the foundations of machines, intake, forebay, etc.

The entire hydro-electric installation will be constructed, erected, tested and placed in operation under the supervision of Major A. J. de Lotbiniere, R. E. Major D. Fraser, R. E., and Capt. Thomson, R. E., will act as his engineering representatives in London. Mr. A. C. Jewett; formerly of the General Electric Company, will serve as installing engineer for the Government. Mr. Jewett was connected with the installation of the Cauvery plant and his selection as erecting engineer for the Jhelum River installation comes as a well-deserved recognition of his ability.

LE PARISIEN CARRIAGE FACTORY, MANILA

LE PARISIEN CARRIAGE FACTORY.

The large and well equipped carriage factory, "La Parisien," situated at 340 Calle Palacio, Walled City, is one of the finest factories of its kind in the Far East. Mr. Blanco, the proprietor, has had many years' experience in carriage building, constructed of native wood, and has found that "narra" and "banuyo," after having been duly seasoned by air drying for two years, bring the best results for carriage and carromata construction.

The factory uses the famous English spring (scroll elliptic) exclusively on all carriages making a very easy riding vehicle. The wheels used are from the best American manufacturers, and the tires Goodyear's "Diamond" brand. Other tires used are the large and 1½ inch rubber, with special tires, made by Michelen & Co. of Paris. Only the best of leathers are used—such as "Deep Buffed Enamel," "Enamel Split" and "Morrocolene for dashes."

One may be assured, after going through the factory, that durable rigs will certainly be turned out—the care that is taken in placing each part together to make the finished vehicle. Another proof of the durability of the Blanco carriage or carromata is the fact that the factory is patronized, not only by the old timers, but by the principal livery stables, such as the Waldorf, Club, Pedro's and others. This bears out the facts which the Factory guarantee, that their work is the best and their prices the lowest. Mr. Blanco has a fine line of rigs in stock and request the public to visit his show rooms which are situated at the factory, 340 Palacio, Walled City.

MINING

INDIA MINING RETURNS.—The following are the output of Gold during the month of May last:—

Balaghat.—4,450 tons of Quartz crushed yielded 3,542 oz. and 4,003 tons of Tailings cyanided yielded 397 oz , making a total of 3,938 oz. of Gold.

Champion Reef.—Milled 14,986 tons which produced 11,161 oz. and 17,340 tons of Tailings treated by the Cyanide Process produced 2,497 oz., making a total production of 13,658 oz of Gold.

Hutti (Nizam's).—931 oz. of Gold from 2,150 tons of Quartz crushed and 279 oz. from 2,050 tons Tailings cyanided, making a total yield of 1,210 oz. of Gold, estimated value Rs. 69,000.

Mysore—14,450 tons of Quartz crushed produced 14,705 oz. Steamings from plates 807 oz. and 13,500 tons of Tailings cyanided yielded 1,766 oz., making a total production of 17,278 oz. of Gold.

Mysore West.—Mill ran 662 hours, crushed 2,160 tons and yielded 687 oz. Bar Gold, and 2,496 tons of Tailings treated by the Cyanide Process yielded 110 oz. of Standard Gold

Nundydroog.—6,750 tons of Quartz crushed yielded 5,278 oz. 7,290 tons of Tailings cyanided yielded 753 oz., making a total yield of 6,031 oz. of Gold.

Ooregum.—Stuff crushed 10,172 tons, Gold produced 4,685 oz. and Slimes and Tailings cyanided 10,098 tons, Gold produced 917 oz. making a total return of Gold 5,602 oz.

FUSHUN COAL MINE.—The Nichi Nichi Shimbun and other journals have an interesting note on the Fushun coal mine. We (Japan Mail) read that the seam of coal is from 100 to 120 feet thick, and that it extends to a width of 10 miles. Experts say that there is no such deposit of coal known to exist elsewhere in the world. It would be easy to obtain seven or eight thousand tons daily, when the new American machinery is adopted, but the Japanese Government does not desire to inaugurate any keen competition with the home mineral, and consequently the production will be limited to some 3,000 tons, varying, of course, according to demand. The coal, it is estimated, can be taken from the mine at a cost of 1.20 yen per ton. The expense of carriage to Dalny (270 miles is now 2 sen per mile, but it will be reduced to one sen. The cost of handling is calculated at 1.50 yen, and the freight to Shanghai will represent 3.50 yen. Thus the mineral can be laid down at Shanghai for 8.90 yen. What price will there be asked for it the Tokio papers do not say, but if it be sold at 10 yen, and if 10 sen be allowed for commission and expenses, the net gain to the owners of the mine would be 3000 yen daily or 1,095,000 yen yearly. That is not a very striking figure.

NEGRI SEMBILAN TIN.—The output in April was 6,190.14 piculs against 5,677.17 piculs in the month before.

The approximate value of the metal, reckons the "Perak Pioneer" was $533,404.36 on which duty amounting to $73,780.20 was collected.

Comparative return for the first four months of 1905 and 1906:—

		Output Piculs	Duty $
4 months	1905	27,006.39	286,124.29
,,	1906	25,195.65	289,305.25
A decrease of		1,810.74	
An increase of		......	3,180.96

The budget having estimated $288,666.66 as the revenue for four months of the year, the excess over those figures is only $638 59.

MALACCA.—Tin mining, insignificant in Malacca during the last half century, showed signs of improvement. Royalty at 10 per cent brought in $2,760, more than double that of 1904. Mr. R. N. Bland proposes to recast the mining regulations which at present are very inadequate. A syndicate has been at work dredging for tin on the sea bed at the mouth of the Linggi River. The return of tin so raised in 1905, shows only 48 piculs.

THE KELANTAN GOLD DREDGING CO. (NO. 1) LTD.—Summary of Gold Won during the Five Months January to May, 1906.

	oz.	dwt.	grs.
January	150	0	11
February	452	2	6
March	402	6	5
April	522	10	9
May	433	9	5
	1,960	10	0

During January dredging operations were hampered by heavy floods. The above returns were obtained by 3 dredges as under. In January one dredge 2 weeks, one dredge 3½ weeks. In February, two dredges 4 weeks, one dredge 1 week. In March, two dredges 3 weeks, 1 dredge 4 weeks. In April, two dredges 4 weeks, one dredge 3 weeks. In May, three dredges 4 weeks each.

THE DUFF DEVELOPMENT CO., LTD.—Summary of gold won by Prospecting Dredge during the months of January, February, March, April, and May, 1906.

	oz.	dwt.	grs.	
January	36	9	3	Small return during January due to flood season.
February	76	12	12	Until 24th February, Dredge was prospecting River bed.
March	279	0	21	
April	113	10	6	In April a breakdown in machinery occasioned a week's stoppage.
May	184	3	0	The gold shown as won in May was recovered during the four weeks ending 26th May.
	689	15	18	

The Kledang Tin Mining Co., Ltd., has been registered in London. Capital £100,000 to acquire the mines and undertakings carried on by Foo Choo Choon of Perak and to adopt an agreement with the Hearwood Syndicate. No initial public issue; first directors J. Wickett, S M. Abbott, Foo Choo Choon, T. W. Field, H. Rich and C. V. Thomas; qualification 500 shares, remuneration £50 each for first year; £100 each afterwards. Register Office, Station Hill, Redruth, Cornwall.

A Home paper of the 26th ult , says:—Amongst the visitors to Australia, when the last mail left, was Mr. C J. Lock, formerly general manager of the Raub Australian Gold Mining Company - situate in the Malay Peninsula—which has been worked chiefly by Queensland capital. Mr Lock is representing, it is stated, two or three London combinations interested in Australian mining, who are anxious to invest in tin-mining properties.

Pahang Gold Export.—The Pahang gold export in May was 723 ounces, all from the Raub mine. This makes a total of 4,031 ounces for the first five months of this year, which is but 6 ounces more than five-twelfths of the output in 1905. Last month's output was obtained from 5 807 tons of stone crushed, Bukit Koman having contributed 568 ounces out of 3,499 tons, and Bukit Malacca 155 ounces from 2,308 tons; the average yield is given as 3.23 dwts and 1.34 dwts to the ton, respectively. The April figure is only 11 ounces more than that of March. The Koman average is slightly lower than that of the previous month, while that of Bukit Malacca is higher.

Bersawah Gold Mining Co.—The Manager of the Bersawah Gold Mining Co. reports that crushing at this mine recommenced on the 21st of May. The New Shaft is now completed to a depth of three hundred feet and the result of the preliminary crushing shows 82 ozs 15 dwt. of gold for 180 tons of ore crushed; the average working out at 9.19 dwts. per ton.

The Chinese Engineering and Mining Co., Ltd.—Total output of the Company's three mines for the week ending 26th May, 1906, amounted to 19,747.38 tons and the sales during the period to 19,108.55 tons.

The Societe des Mines d'Etain de Kinta has declared a dividend of f32.50 a share and of f 67 50 for deferred shares for 1905, against f30 and f54 distributed respectively for 1904.

The Mining Leases of the Chenderiang Hydraulic Tin Mining Co., Ltd., have been forfeited for failure to fulfil conditions of lease.

The Tronoh Mines.—Output for the month of May was 2,777.51 piculs of undressed tin ore, valued at $130,000.

ELECTRICAL

Bangkok Tramways:—The new company which was formed a short time ago for the construction of a steam tramway from Bangkok to Pakret and Ban Mai has obtained its concession. Among the conditions laid down is that the company (the Muang Non Tramway Co., Ltd.) must construct a good carriage road, with bridges in conjunction with the tramway to Ban Mai, beyond Pakret. In consideration of this the Company will be exempted from taxation for a period of eleven years. The work has already been started, the route surveyed, some of the earthwork and filling-in begun, and part of the materials has arrived.

The line and road will run from near Dusit Park Palace, connecting with the line of the Siamese Tramway Company.

The cost of construction of road and tramway together is estimated in the neighbourhood of a million ticals, and the work will take some eighteen months to accomplish. The road will cross something like 30 klongs.

This will be the pioneer road out of Bangkok, and it is to be hoped that it will be the first of many others.

Another concession, it is expected, will shortly be granted for the construction of the long-talked of electric tramway in Bangkok, on the West side of the river. This, as projected, will run from opposite Chakrawat road to the mouth of Klong Bangkok Noi, with a branch off to Talat Plu on Klong Bangkok Yai, connecting with the Tachin Railway at Talat Plu. The route has been surveyed, and it is expected that the concession may be signed shortly, and then the work will at once be put in hand. The Company is to be known as the Thalart Bhloo Tramway Co., Ltd. The proposed site for the power house is on the southern side of Klong Bangkok Yai, between Wat Kanya and Wat Bupparam.

H. R H. Prince Naradhip, Chairman of the Siamese Tramway Co., Ltd., is the moving spirit in both these enterprises.

Electric Plant, Singapore:—Complete electric light installation has just been added to s. s. *Sappho* of the Straits Steam Ship Co. Electric fans and lights have been fitted in the saloon and cabins, giving comfort and pleasure to the traveling public, who will no doubt appreciate this great improvement. The whole installation has been supplied and fitted on board by Messrs. Riley, Hargreaves & Co.'s Electrical Department.

Tokio Tramways:—The three electric street-car companies of Tokyo propose to amalgamate. Recently the leading shareholders of the three companies held a meeting respectively and discussed conditions for amalgamation.

WATERWORKS AND IRRIGATION

Water-Works in Siam.—We learn that the work of cutting the canal which is to supply the town of Paklat with a wholesome water supply from the Meklong river, has recently been begun, and that a large number of coolies are already employed. A flood gate will be constructed at the entrance of Klong Paklat, and thus the possibility of salt water coming any distance up, will be averted. The inhabitants of Paklat, have been put to very great straits in years gone by through lack of drinkable water during each successive dry season, and it is hoped that this undertaking will supply the long-felt want, with irrigating the vast area of rich and fertile land through which the canal will run from the river Meklong to the Menam.

It is to be ardently hoped that the work of cutting the canal from Chainat, through which Bangkok is to be supplied with a water supply, will also be energetically taken in hand in the near future. In Siam we have no labour problems such as confront other eastern countries, and therefore there is no reason why these vital works should not be pushed ahead, and thousands of valuable lives spared to the kingdom.

Korean Waterworks:—The prospectus of the Korean Waterworks, Limited, has been issued. The capital is £250,000, in £1 shares, but only 5 per cent debentures, to the amount of £250,000, will be offered to the public at 87½ per cent. The company acquires a concession for 49 years from the date of opening, for the exclusive supply of water to Soul and outlying towns, at present supplied by public wells, usually located at the side of the streets, contaminated by sewage, and undoubtedly the cause of frequent epidemics. The new company will draw its supplies from the Han River on which the capital of Korea is situated, and Messrs. Livesey, Son, and Henderson estimate that, on the basis of 8 gallons of water per head per day, the net revenue will amount to £29,000, or more than twice the amount required for interest and redemption of the debentures.

Water Supply, Kuantan F. M. S.:—The town has now a proper water supply, which was provided last year at a cost of $15,000. The water has been brought in from the Galing river at the back of the town, and is distributed by means of standpipes. Raub is the first town in Pahang that got its water-works, an adequate supply having been provided there a few years ago. At Pekan, Temerloh and Lipis, the people obtain their water from rivers and wells.

Dredging Tung-Ting Lake, China:—At the request of the British Charge d'Affaires in Peking, the Wei-Wu-Pu has wired the Viceroy and the Governor of Hu-nan with reference to the unsatisfactory state of the Tung-ting Lake which has become so shallow in recent years that navigation from Hankow to Changsha and beyond by steam launches is greatly interfered with. Their Excellencies have been advised to make a thorough investigation of the Lake so that modern steam dredgers may be purchased by them.

Shimonoseki Water-Works:—Trouble is reported from Shimonoseki in connexion with the waterworks. An embankment, presumably of the reservoir, threatens to give way, and its collapse would mean the inundation of numerous habitations. It is said that the responsible engineer is found to have scamped his work and employed means which could not have had more than temporary efficacy.

Whangpoo Conservancy:—The Agreement between the Chinese Conservancy Commissioners (the Shanghai Taotai and Mr. H E. Hobson) and Mr. de Rijke, as Engineer-in-Chief to carry out the conservancy scheme for the Huangpu, was signed on June 7.

Howarth, Erskine, Ltd., have secured the contract for the Port Trust Wharf at Rangoon. Their tender was in the neighbourhood of £ 30,000 sterling.

SHIPBUILDING

The N. Y. K.'s Shipbuilding Programme —The *Asahi* states that the N. Y. K. steamer *Osumi Maru*, which was launched at the Osaka Ironworks on the 6th inst., will shortly be used on the service between Awomori and Muroran. A steamship which is being built for the Kaisha at the Mitsubishi Dockyard, Nagasaki, to take the place of the ill-fated *Hitachi Maru*, will be launched in November. Three other steamers (each of 3,500 tons), which are being built at the Kawasaki Dockyard, will be launched by March next. A steamer of 2,111 tons and two others of 2,511 each are being built at London. The former will be launched about August next, and the latter by March next year. As previously recorded, the company is likewise making arrangements for the construction of six big steamships, each of 8,589 tons. Of these two will be built at the Mitsubishi Dockyard, and four at the Kawasaki and some other Dockyards.

Riley, Hargreaves & Co.'s New Steamer:—Messrs. Riley, Hargreaves and Co., Ltd., launched from their Shipbuilding Yard, Singapore, on the 8th inst., the twin screw tug-boat *Kinta*, built for the Railway Department of the Federated Malay States. The dimensions are 95′ by 19′ 6″ by 8′ 6″, and the vessel has been built to Lloyd's 100 A.1 Class. The engines, also made by Messrs. Riley, Hargreaves & Co., Ld., are compound surface condensing and together are designed to indicate 400 horsepower. Steam is supplied to the main engines and auxiliary machinery by one large marine multitubular return tube type boiler having two Deighton furnaces. One special feature on board is a Merryweather's fire engine, which has a capacity of 1,100 gallons per minute.

Kawasaki Dockyard Co:—Mr. Matsukata, the President of the Kawasaki Dockyard Co., is said to have stated to an interviewer that the company desires to obtain shipbuilding orders from China, Siam, and all the other oriental countries. With this view it is purchasing about ten thousand tsubo of land at Shanghai and Pootung for the purposes of shipbuilding and repairing, with especial relation to the shipping at Shanghai and on the Yangtsze. At first only repairs will be undertaken there, and eventually a dockyard on a large scale will be developed. Extensions of the Company's property are also in progress at Kobe, in consequence of the increasing size of the vessels constructed in the dockyard there.

The Osaka Ironworks:—The Osaka Ironworks have large orders for water-pipes from the Saseho and Maizuru Port Admiralties, the Kwangtung Administrative Bureau, the Imperial Iron Foundry, and the Electric Railway in Korea. Most of the orders are to be executed by next month or July. The ironworks are now building three steamers, each about 700 tons, for the Osaka Shosen Kaisha, and a destroyer of the same type as the "Asatsuyu," lately launched.

The Nippon Yusen Kaisha announce that they will put three extra passenger steamers viz:—"Satsuma Maru" "Tairen Maru" and "Tategami Maru" on their Shanghai-Yokohama Line, in addition to their regular Mail steamers "Kasuga Maru," "Hakuai Maru" and "Kosai Maru" thus to maintain regular service of twice a week. They will also run "Fushiki Maru" and "Niigata Maru" from Kobe to Hankow via Shanghai.

New Cable Steamer:—The cable steamer Petrel, built by Messrs. Swan, Hunter and Wigham Richardson, Ltd , to the order of the Eastern Extension, Australasian and China Telegraph Company, Ltd., has been completed The principal dimensions of the vessel are 357 ft. by 44 ft. by 21 ft., engine cylinders 53in., 39in., and 61in. diameter by 42in. stroke, with four large boilers.

Dutch Steamship Line:—A combination of two Dutch companies is to start a line of steamers from Calcutta, calling at Rangoon, thence proceeding to Penang (should inducement offer), to Deli, and on to Batavia and Sourabaya. This enterprise will provide for the bulk of the India-Java trade.

Kawasaki Dockyard, Kobe:—On the morning of June 11th the Chinese gun-boat *Chu Tung* was successfully launched. This is the second of six sister-ships of the *Chu Tai* class, which latter vessel was launched about June 1st. These vessels are 200 feet long, with a displacement of 740 tons and a speed of 13 knots.

Nippon Yusen Kaisha's Siam Line:—The N. Y. K. has determined on running regular liners between Hongkong and Bangkok, of about 2,000 tons, once every fortnight. So far, the carrying trade of Siam has been monopolised by German ships, via Singapore.

New Steamer, Tongku:—The Company Docks et Appontement du Tongku has recently launched a steamer for local work called the *Perrinette*, which was entirely constructed at the works, and is a credit to her builders.

China Borneo Co., Ld., Sadakan:—The lighter recently completed by the China-Borneo Co., for their own use, the *Ruby*, started active service on the 20th ult. The place vacated by her in the Company's Works has been taken by a new lighter for the Coal Co., at Tawao. The same yard launched a light-draft launch, also for the Tawao Coal Co., on the 25th ult. It is understood a small lighter, for a local Company, will be started forthwith on the vacant berth. The lighter building at the North Borneo Trading Co.'s works, for the Exploration Co., is also progressing very satisfactorily, and is soon to be ready for launching.

MISCELLANEOUS

Lumber Mills, Japan.—Some important developments are about to be made with the aid of foreign capital in the timber and glass industries in Japan. A concern has been formed with a capital of $475,000 gold, which will carry on the lumber and sawmill business in Japan, three or four mills being established in different parts of the country. The principal branch of this business will be the export trade, and Canadian engineers will be in charge of the newest and best machinery, to be driven by electricity. The capital is furnished by French, English, and Japanese capitalists, and all the shares are taken by the promoters. The capital of the big glass undertaking is $750 000, furnished by French, Belgian, English, and Japanese capitalists, also taken by the promoters and fully paid up. The factory will be at Osaka. The technical engineers, foremen, and many of the workmen will be French and Belgian. Both syndicates, which are represented in Japan by R. Loonen, had their origin or conception in Paris.

FAR EASTERN SHARE QUOTATIONS

Courtesy of Benjamin, Kelly & Potts, Sharebrokers, Hongkong, July, 1906.

STOCK	WHEN ESTABLISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation*	CLOSING QUOTATIONS
											PER CENT	
Banks.												
Hongkong and Shanghai Banking Corporation	1865	$10,000,000	80,000	$125	$125	g £1,000,000 s $9,500,000 i $250,000	$1,699,777	31-12-05	£1.15/- div. & £1 bonus @ ex. 2/0-9/16 $26.87 for second half year 1905	26 2-06	5½	$822½ buyers London £92-5- £92-5-/-
National Bank of China, Limited	1891	£699,475	(10) 99,925	£7	£6	c £12,735 $150,000	$74,099	31-12-05	$2 (London 3/6) for 1903	1-2-04	—	$47 cum call
Marine Insurances.												
Canton Insurance Office, Limited	1881	$2,500,000	10,000	$250	$50	$1,600,000 j $147,895	$211,540	31-12-04	$20 for 1904	21-10-05	5¾	$342½
North China Insurance Co., Ld.	1863	£150,000	10,000	£15	£5	g £100,000 s Tls. 100,000 f Tls. 50,000	Tls. 302,053	30-6-05	Interimdiv. of 7/6 @ ex. 2/10 1/16 =Tls. 2.62. on a/c 1905	1-5-06	5½	Tls. 90 sellers
Union Insurance Society of Canton, Limited	1867	$2,500,000	10,000	$250	$100	s $2,000,000 g £40,000 f $331,131 j $1,153,844 u $569,279	$2,792,271	31-12-05	Interim div. of $30 for 1905	30-4-06	4½	$810 sales & b.
Yangtsze Insurance Association, Ld.	1862	$800,000	8,000	$100	$60	$800,000 j $61,278 f $15,527	$508,334	31-12-05	$12 and $3 special dividend for 1904	19-4-06	8½	$175 sellers
Fire Insurances.												
China Fire Insurance Co., Ld.	1870	$2,000,000	20,000	$100	$20	$1,000,000 x $229,488 f $2,616	$344,098	31-12-05	$6 for 1904	9-3-06	7	$86 buyers
Hongkong Fire Insurance Co., Ld.	1868	$2,000,000	8,000	$250	$50	$1,220,928	$422,618	31-12-05	$25 for 1904	8-3-06	8	$312½
Shipping.												
China and Manila Steamship Co., Ld.	1882	$750,000	(1) 30,000	$25	$25	$6,000	$6,563	31-12-05	$1½ for 1905	15-3-06	7½	$20
Douglas Steamship Co., Ld.	1883	$1,000,000	20,000	$50	$50	$264,638 i $88,941	Nil.	30-6-05	$3½ for year ended 30-6-1905	25-9-05	8¼	$43 buyers
Hongkong, Canton and Macao Steamboat Company, Ld.	1865	$1,200,000	80,000	$15	$15	e $250,000 d i $600,000 f $154,331	$24,080	31-12-05	$1 for 2nd half-year mak. $2 for 1905	16-2-06	7½	$27
Indo-China Steam Navigation Company, Ld.	1882	m £600,000	(2) 60,000	£10	£10	£120,000 i £280,958 h £3,999	£2,452	31-12-05	10/- for 1905	Due 7 06	6	$76½ sellers
Shanghai Tug and Lighter Co., Ld. Do. Preference.	1903	Tls. 1,500,000	200,000 100,000	Tls. 50	Tls. 50	i Tls. 40,000	Tls. 23,156	31-12-05	Final of Tls. 3. making Tls. 5 for 1905 Final of Tls. 1¾ making Tls. 3½ for 1905	13-3-06	8 7	Tls. 62 sellers Tls. 51 buyers
"Shell" Transport & Trading Co., Ld.	1898	£2,000,000	2,000,000	£1	£1	£400,000 i £4,144	£107,815	31-12-04	1/- (Coupon No. 6) for 1905	1-1-06	4	27/-6 sales
"Star" Ferry Co., Ld	1898 1900	$200,000	10,000 10,000	$10 $10	$10 $5	$65,000 i $32,957	$218	30-4-06	$1.50 75 cents for year ended 30-4-1906	31-5-06	5 3½	$30 $21
Taku Tug & Lighter Co., Ld.	—	Tls. 1,500,000	12) 30,000	Tls. 50	Tls. 50	Tls. 98,000 d Tls. 305,479 e Tls. 48,000 i Tls. 81,200	Tls. 13,913	31-12-05	Final of Tls. 2 making Tls. 4 for 1905	1-3-05	9	Tls. 45 sellers
Refineries.												
China Sugar Refining Company, Ld.	1878	$2,000,000	20,000	$100	$100	$850,000 e $450,000 r $86,129	$40,419	31-12-05	Final of $15 making $25 for 1905	22-3-06	16½	$150 sellers
Luzon Sugar Refining Company, Ld.	1882	$700,000	7,000	$100	$100	none	Dr. $132,588	31-12-05	$3 for 1897	24-3-98	—	$20 sellers
Perak Sugar Cultivation Co., Ld.	—	Tls. 350,000	7,000	Tls. 50	Tls. 50	Tls. 100,000	Tls. 3,723	31-7-05	Tls. 2½ for year ending 30-9-1904	20-12-04	—	Tls. 100 sales
Mining.												
Chinese Engineering & Mining Co., Ld.	1901	£1,000,000	1,000,000	£1	£1	d £80,000 h £12,289	£13,355	28-2-05	1/-(No.6) int.d. for 12m. endg. 28.2.06	1-5-06	7	Tls. 9.80 sellers
Oriental Consolidated Mining Co., Ld.	1901	G. $5,000,000	y 500,000	G. $10	G. $10	none	G. $909,050	30-6-05	Final of 50 cts. mak. G. $1 for 1905	21-12-05	7	G. $14
Raub Australian Gold Mining Co., Ld.	1892	£200,000	150,000 50,000	£1 £1	18/10 £1	£4,873	Dr. £8,745	31-3-05	No. 12 of 1/-=48 cents	28-1-01	—	$3¼ sales

STOCK	WHEN ESTABLISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation *	CLOSING QUOTATIONS
											PER CENT	
Docks, Wharves and Godowns.												
Fenwick (Geo.), & Company, Ld.	1889	$450,000	z 18,000	$25	$25	$70,000	$8,915	31-12-05	$2 on old & $1 on new issue for 1905	12-3-06	9	$22
Hongkong and Kowloon Wharf and Godown Co., Ld.	1886	$2,000,000	40,000	$50	$50	$550 000 d.r. $65,160 i $20,000	$20,040	31-12-05	Final of $3½ making $6 for 1905	15 3-06	5¾	$104 buyers
Hongkong & Whampoa Dock Co., Ld.	1866	$2,500,000	50,000	$50	$50	$49,500	$362,323	31-12-05	$6 for second half year making $12 for 1905	27-2-06	8	$150
New Amoy Dock Co., Ld.	1892	$67,500	10,000	$6¾	$6¾	$88,000	$2,221	31-12-05	$1 for 1905	1-3-06	5½	$18
Shanghai Dock and Engin'g Co., Lt.	1901	T5,520,000	55,200	Tls. 100	Tls.100	Tls.1,000,000	Tls.34,924	30-4-05	Interim of Tls. 4 for year 1905-6.	6-1-06	11¼	Tls.107 sales
Shanghai and Hongkew Wharf Co. Lt.	1902	T3,200,000	32,000	Tls.100	Tls.100	b Tls.487,210 r Tls.100,734	Tls.57,065	31-12-05	Final of T8 making T14 for 1905	29-3-06	6¼	Tls.222 sellers
Vulcan Ironworks, Ltd.	1905	T500,000	1,000	Tls.500	Tls.500	—	—	—	First year	—	—	Tls.500 buyers
Yangtsze Wharf and Godown Co., Ld.	1902	T250,000	2,500	Tls.100	Tls.100	Tls.30,000	Tls.5,668	31-12-05	Tls.18 for 1905	31-3-06	8¼	Tls.220 buyers
Lands, Hotels and Building.												
Anglo-French Land Investment Company, Ltd.	1906	T2,500,000	(3) 25,000	Tls.100	Tls.100	—	—	—	First year	—	—	Tls.100
Astor House Hotel Co., Ltd.	1901	$750,000	(4) 30,000	$25	$25	$14,156	$9,028	30-6-05	$2½ for year ending 30-6-1905	20-8-05	8	$31 buyers
Astor House Hotel, Ld. (Tientsin)	—	T100,000	2,000	Tls.50	Tls.50	Tls.35,000 e Tls.10,000	Tls.1,013	28-2-06	Final of Tls.6½ making Tls.11½ for year ending 28-2-06	25-4-06	7¼	Tls.147
Central Stores, Ld.	—	$451,845	6,000	$15	$15	—	$4,719	31-12-05	$2.40 on $12 for 1905	13-3-06	13¼	$18 sales
Do. (Founders')	—		123	$15	$12				None	—	—	$300 buyers
Do. (New Issue)	1904		24,000	$15	$15				7 per cent on $7½ for 1905	13-3-06	—	$15¼ buyers
Hongkong Hotel Co., Ld.	1866	$600,000	12,000	$50	$50	$648,975 r $24,071	$619	31-12-05	$5 for 2d half-year making $10, 1905	6-3-05	7¾	$127½
Hongkong Land Investment and Agency Co., Ld.	1889	$5,000,000	50,000	$100	$100	e $250,000	$67,839	31-12-05	Final of $3½ making $7 for 1905	2-2-06	6¼	$113
Hotel des Colonies Co., Ld.	1902	T225,000	9,000	Tls.25	Tls.25	n Tls.29,783	Tls.1,935	31-3-06	Final of 6% making 10% for 1905	31-5-06	16½	Tls.15
Hotel Metropole Company, Limited	1904	$200,000	2,000	$100	$100	none	$4,699	30-6-05	Final of $6 making $10 for the year.	26-7-05	10	$100
Humphreys' Estate & Finance Co., Ld.	1887	$1,500,000	150,000	$10	$10	i $208,386 e $50,000	$5,070	31-12-05	80 cents for 1905	12-2-06	7¼	$11 buyers
Kowloon Land and Building Co., Ld.	1889	$300,000	6,000	$50	$30	none	$574	31-12-05	$2½ for 1905	7-2-06	6½	$38
Shanghai Land Investment Co., Ld.	1888	T2,600,000	52,000	Tls.50	T50	Tls.869,493 e Tls.170,000	Tls.52,194	31-12-05	Final of Tls. 3 making T6 for 1905	23-2-06	5½	Tls.111 buyers
Tientsin Land Investment Co., Ld.	1902	T772,600	7,726	Tls.100	Tls.100	i Tls.71,588	Tls.385	31-12-05	Final of Tls. 5 making Tls. 8 for 1905	24-2-06	7½	Tls.105 sellers
West Point Building Co., Ld.	1889	$625,000	12,500	$50	$50	none	$772	31-12-05	Final of $1.90 making $3.65 for'05	2-2-06	7	$52
Cotton Mills.												
Ewo Cotton Spinning and Weaving Co., Ld.	1895	T1,000,000	(5) 20,000	Tls.50	T50	Tls.45,939	Tls.100,000	31-10-05	T8 for year ended 31-10-1905	18-12-05	11¾	Tls.68 sales
Hongkong Cotton Spinning, Weaving and Dyeing Co., Ld.	1901	$1,250,000	125,000	$10	$10	e $30,000	$23,264	31-7-05	$1 for year ended 31-7-1905	4-9-05	7	$14 sellers
International Cotton Manufacturing Co., Ld.	1895	T750,000	(6) 10,000	Tls.75	Tls.75	Tls.100,000	Tls.18,718	30-9-05	Interim of 3% a/c 1898	30-4-98	—	Tls.61 sellers
Laou-kung-mow Cotton Spinning & Weaving Co., Ld.	1895	T800,000	(7) 8,000	Tls.100	Tls.100	none	Tls.30,760	31-12-05	Tls. 8 for 1905	21-2-06	11¼	Tls.71 buyers
Soey Chee Cotton Spinning Co., Ld.	1895	T1,000,000	2,000	Tls.500	Tls.500	l Tls.18,456	Tls.35,986	31-12-05	Tls. 25 for 1905	7-3-06	8¼	Tls.300 sellers
Miscellaneous.												
Anglo German Brewing Co., Ltd.	1904	$100,000	4,000	$100	$100	none	$1,066	31-12-05	$7 for 1905	1-3-06	7¾	$90 sellers
Bell's Asbestos Eastern Agency, Ld.	1895	£5,377.10s	(11) 8,604	12/6	12/6	£814	£856	31-12-05	1s. 3d for 1905	29-7-05	8¼	$7 ex. div.
Campbell, Moore & Co., Ld.	1886	$12,000	1,200	$10	$10	$9,000	$1,097	31-12-05	$3 for 1905	2-4-06	9¼	$32
China-Borneo Co., Ld.	1903	$720,000	(8) 60,000	$12	$12	none	Nil	31-12-05	$1 for 1904	17-3-05	—	$7½ buyers
China Flour Mill Co., Ld.	—	T200,000	4,000	T50	Tls.50	Tls.50,000	Tls.889	31-12-05	Final of Tls.5 making Tls.10 for 1905	17-3-06	12¾	Tls.79 sellers
China Light and Power Co., Ld.	1901	$500,000	50,000	$10	$10	none	$1,219	28-2-06	60 cents for year ending 28-2-06	9-4-06	6	$10
China Provident Loan and Mortgage Co., Ld.	1898	a $1,000,000	100,000	$10	$10	$100,000	$4,791	31-12-05	80 cents for 1905	22-1-06	9	$9
Dairy Farm Company, Ld.	1896	$187,500	25,000	$7½	$6	$25,000	$2,864	31-7-05	$1.20 for year ending 31-7-1905	24-11-05	7½	$16 buyers

"Open the old cigar box
and let me consider a space"

SOME OF OUR LEADERS
Reina Victoria
Incomparables
Imperiales
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Panetelas
Favoritos
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Consider!

That the Alhambra Cigar Factory uses none but the finest selected Isabela leaf.
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That the quality of each and every grade is strictly maintained.
That our prices are as low as the lowest.
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That correspondence will be promptly answered.
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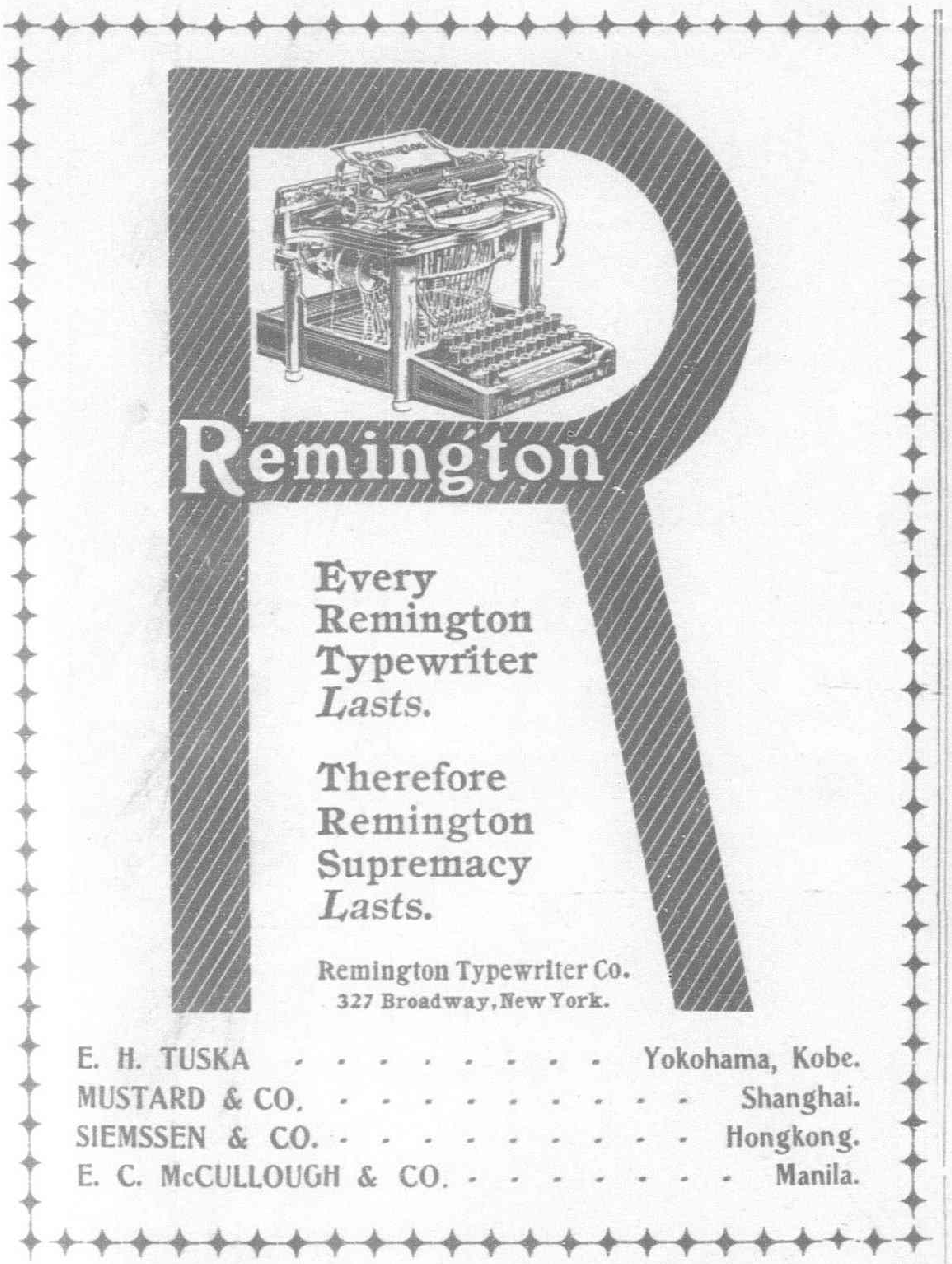

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Every Remington Typewriter *Lasts.*

Therefore Remington Supremacy *Lasts.*

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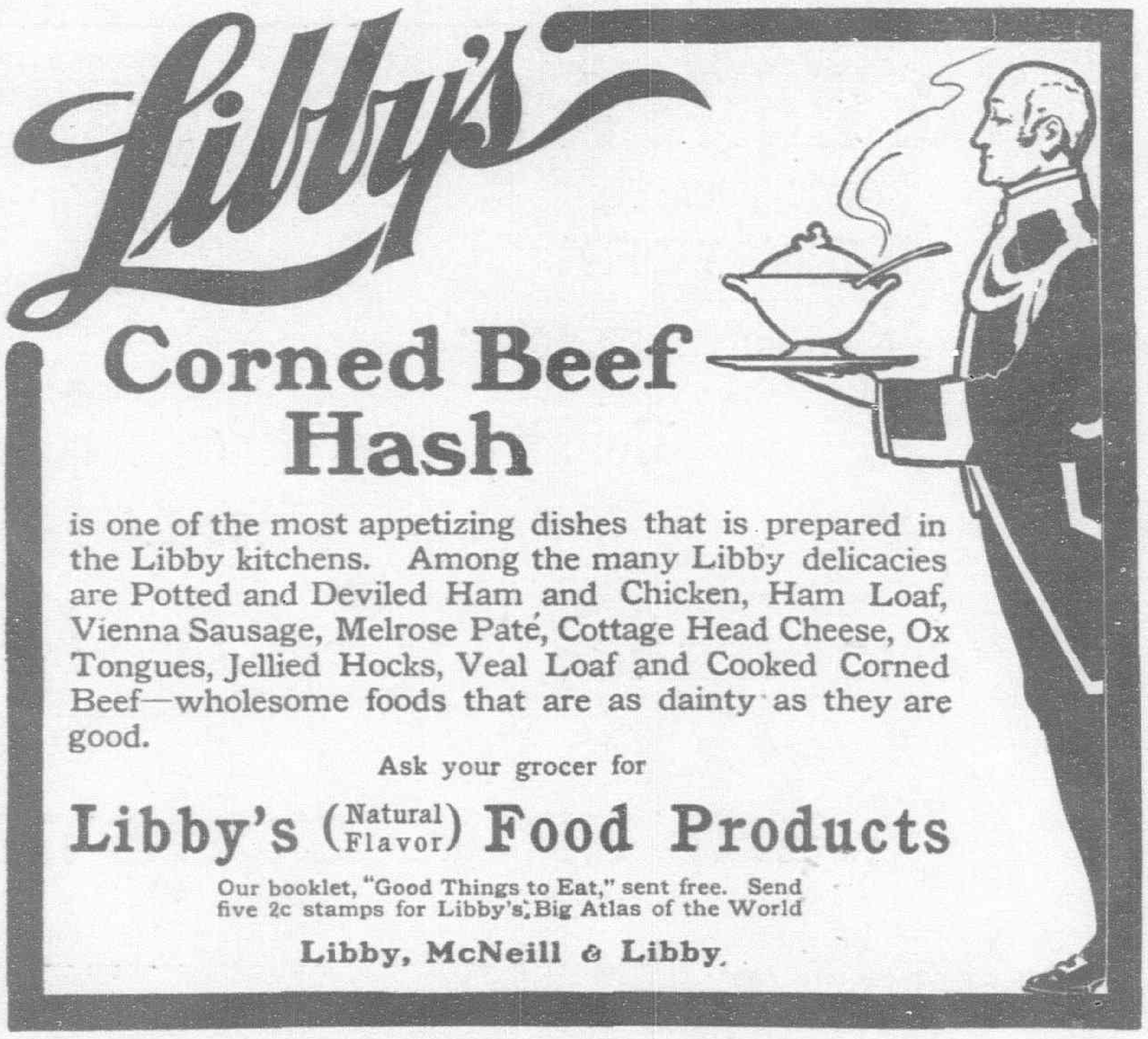

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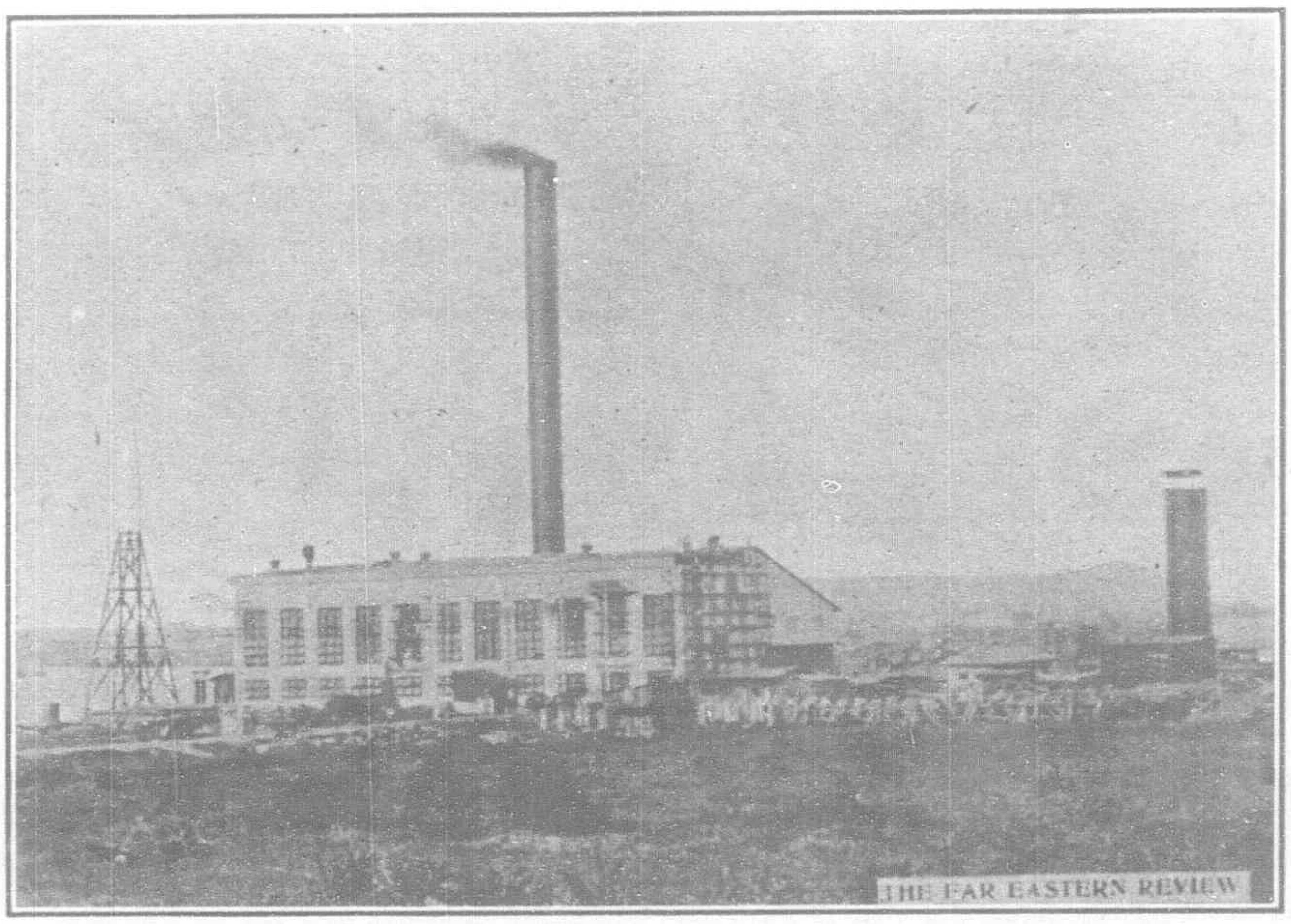

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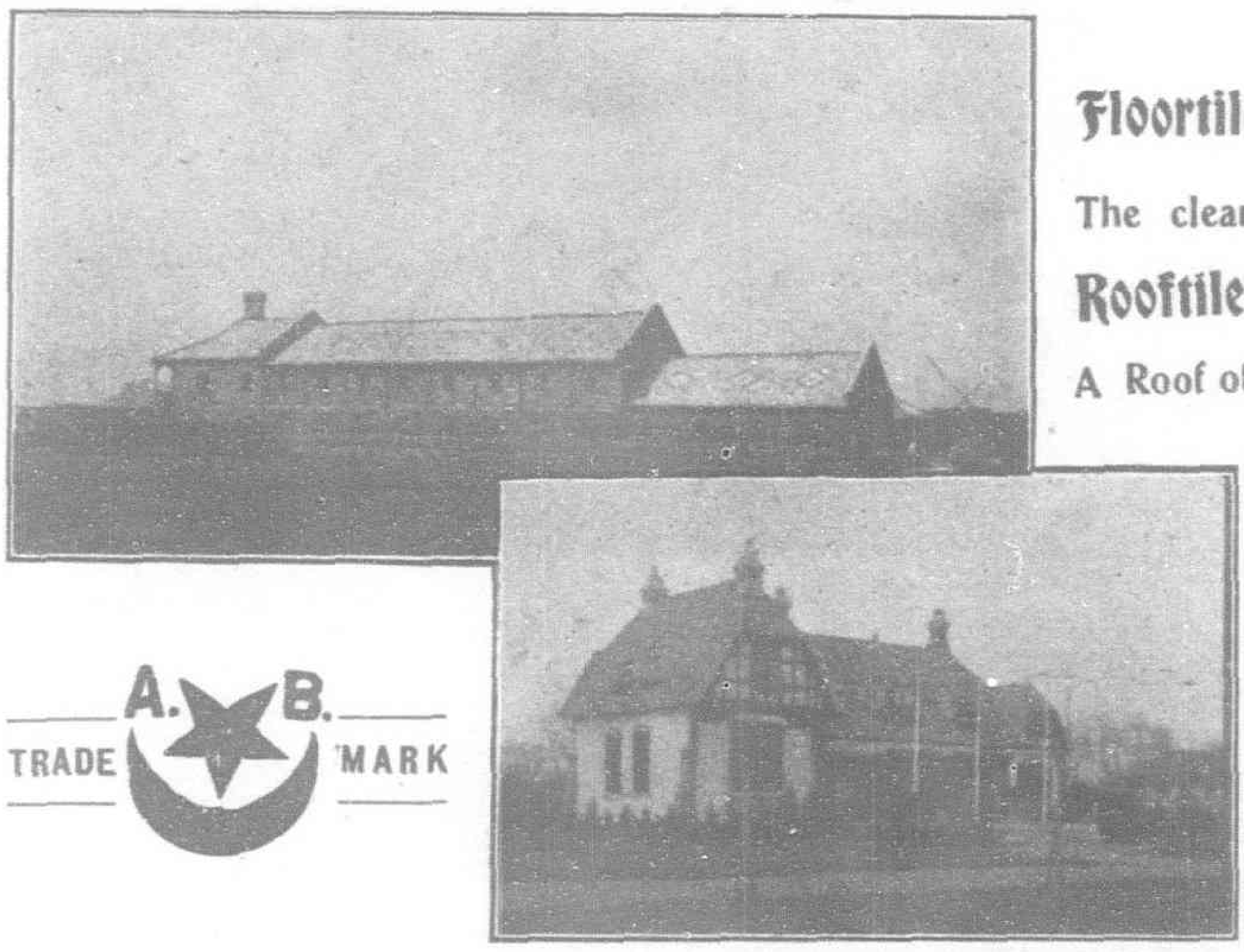

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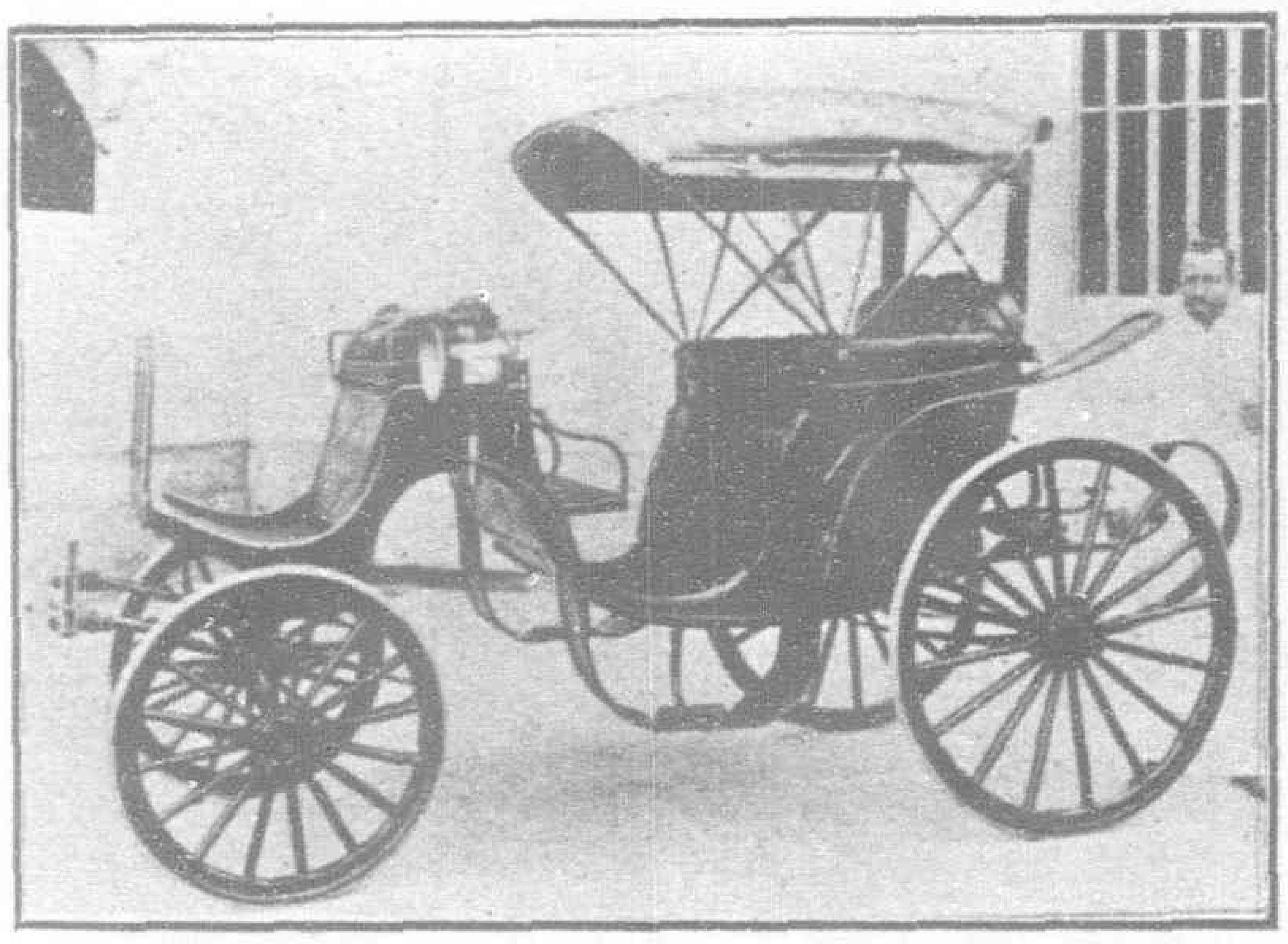

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It is Just the Little Things which Most Manufacturers Consider Trifles that in Their Combined Qualities Produce the

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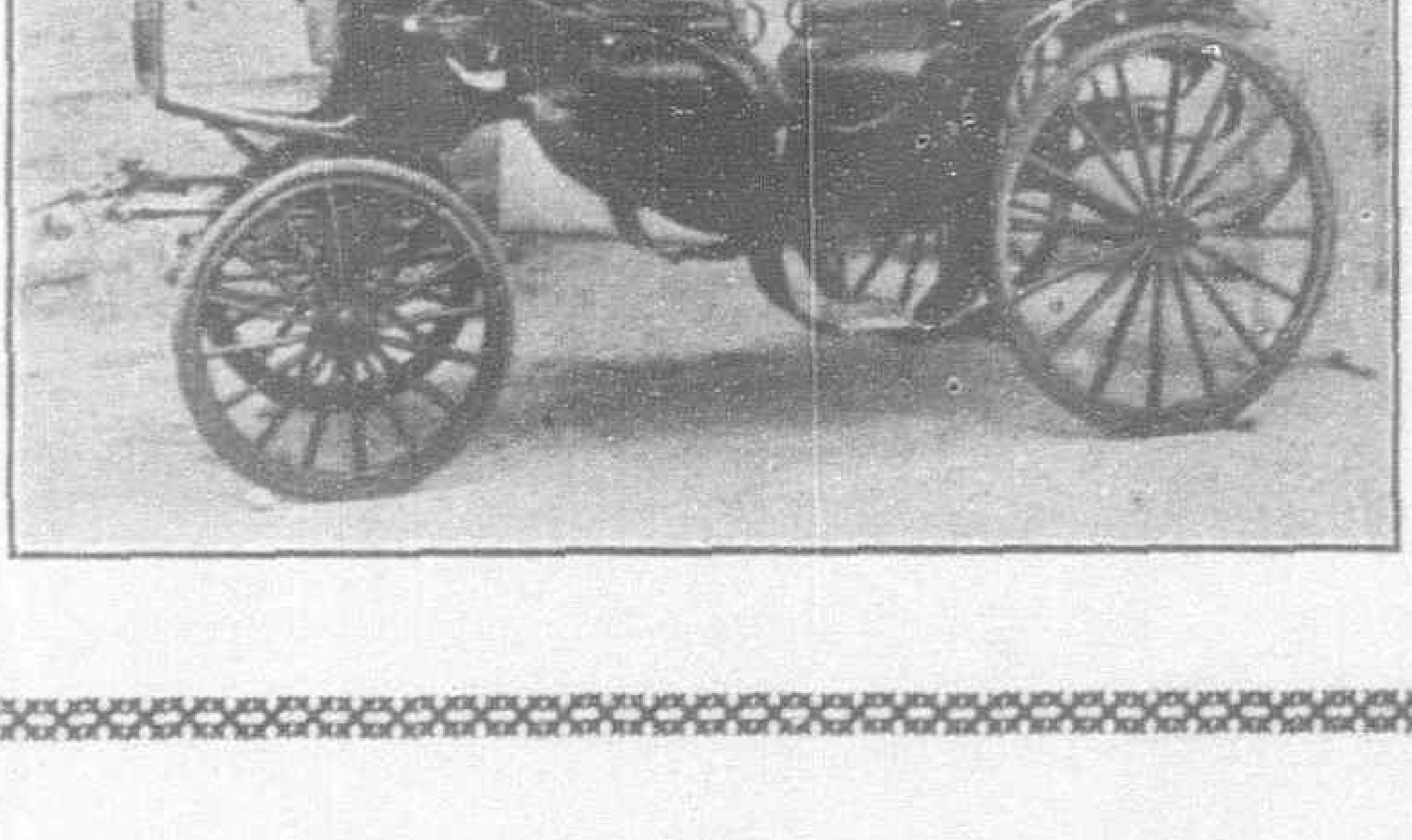

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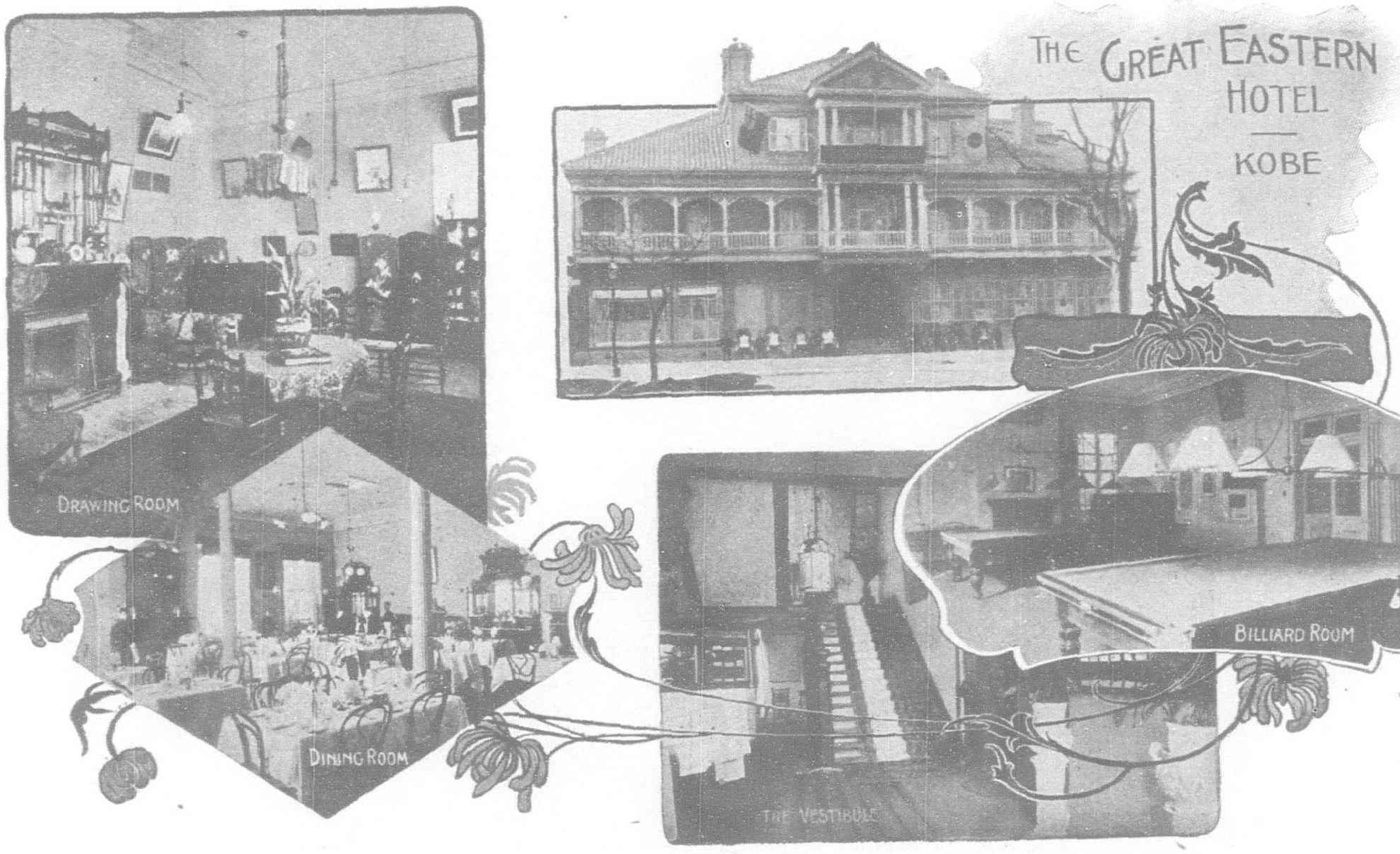
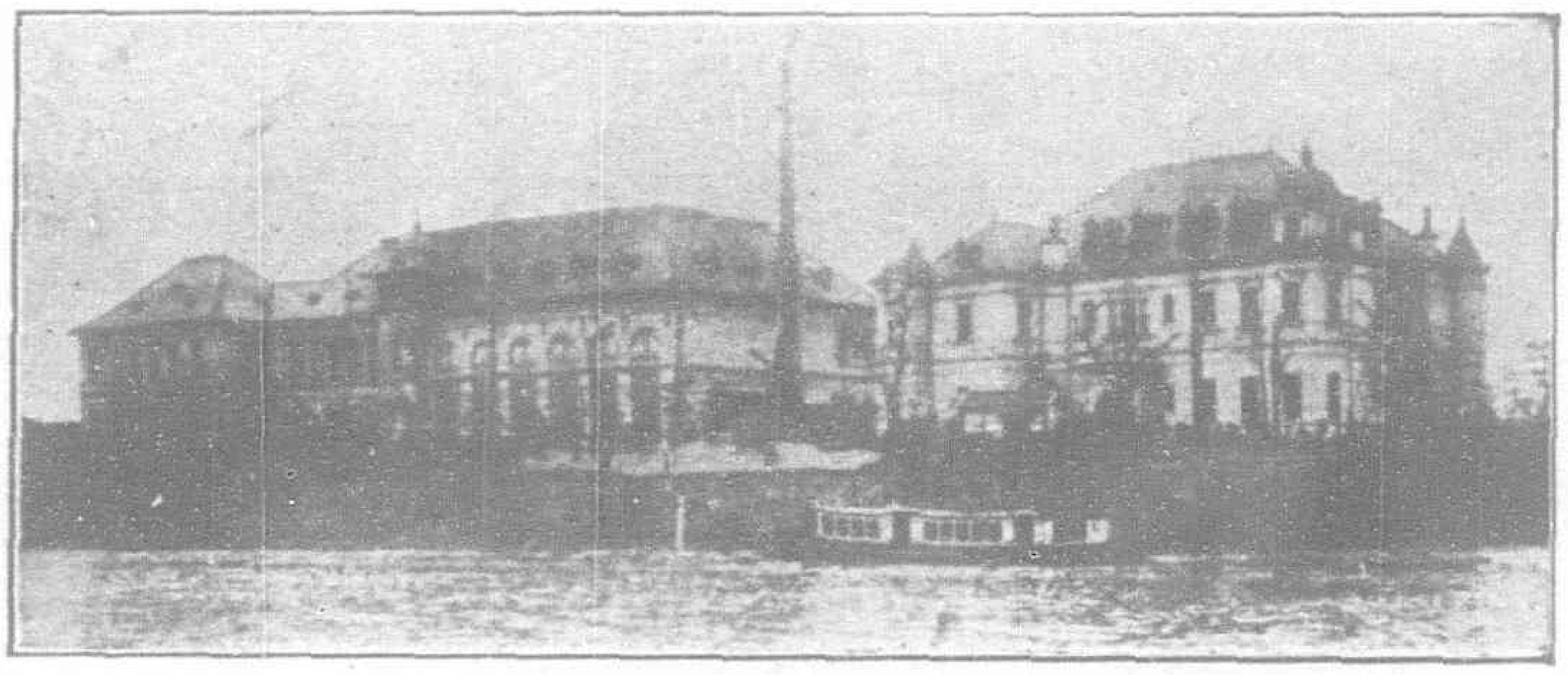


36 Division Street C. M. ARRATOON, Manager



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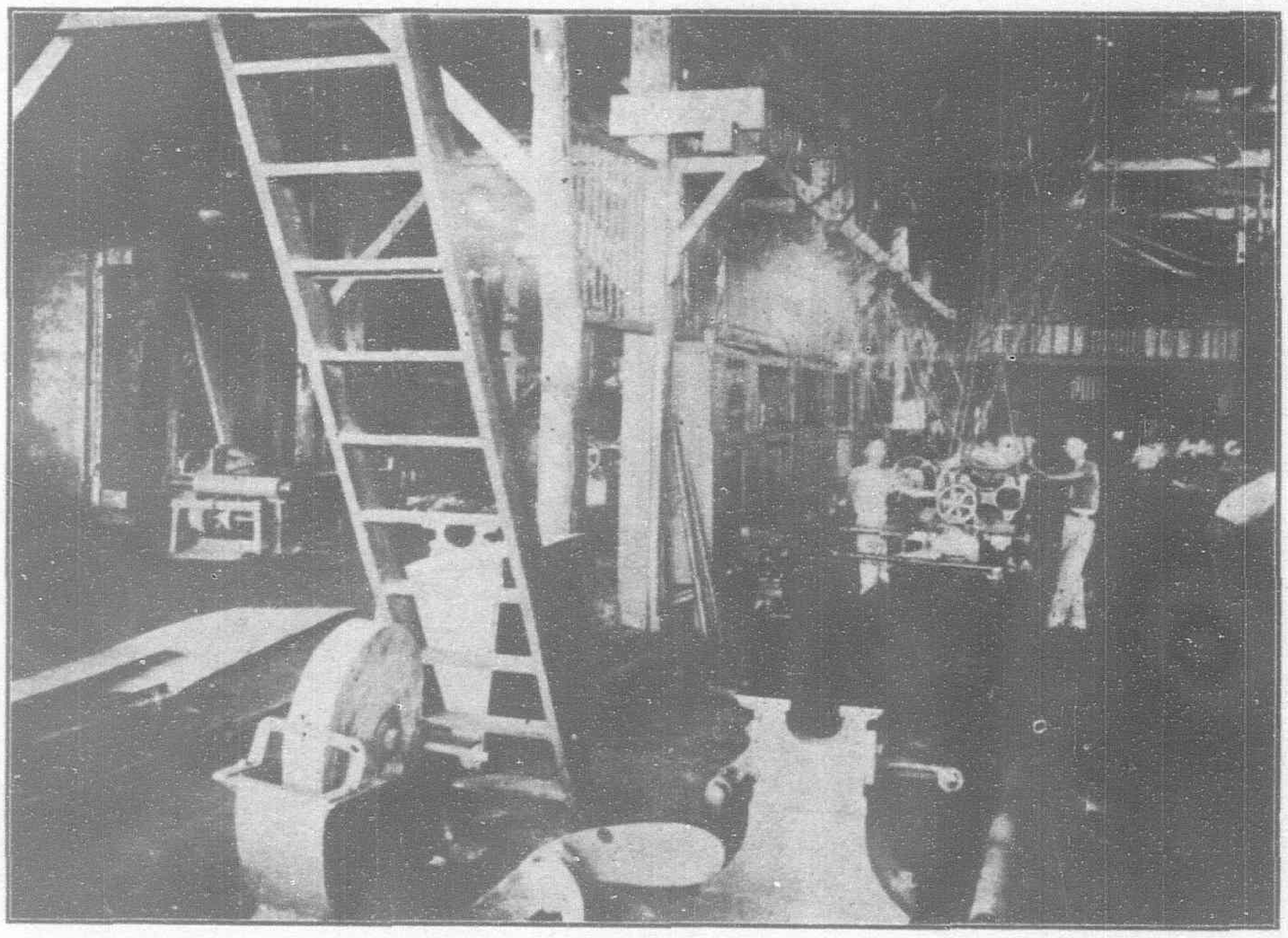

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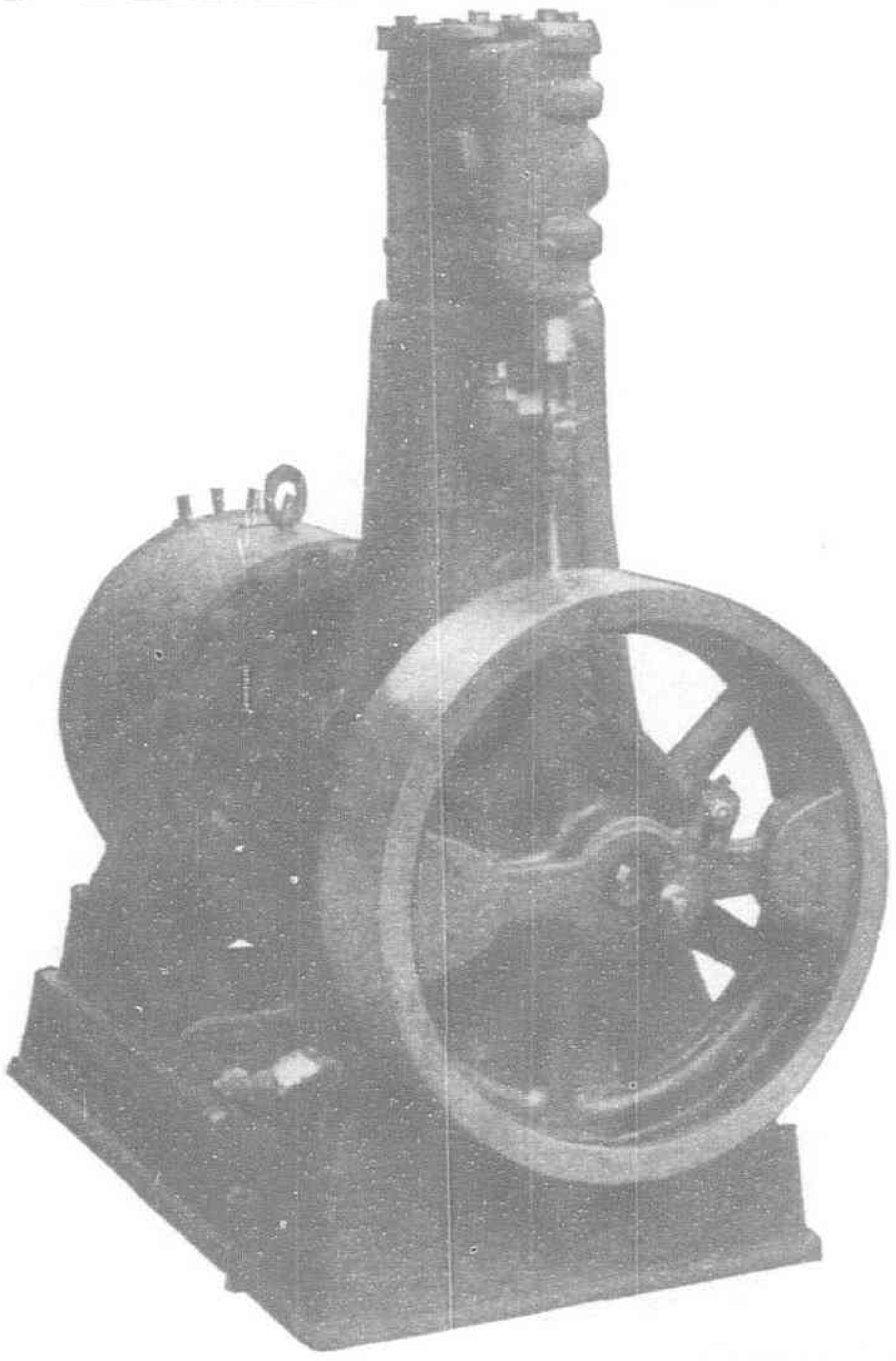

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Zimmer's White Ants Destroying and Wood Preserving Composition

PATENTED IN INDIA, STRAITS SETTLEMENTS AND OTHER COUNTRIES

The COMPOSITION is of great value to the Building Trade, Manufacturers and Railways; for instance, if beams, wooden structures, sleepers, telegraph poles, etc., are coated with the above COMPOSITION, they will remain in a sound condition and in a good state of preservation, as they will not be attacked by wood destroying insects.

It is also advisable for every household in tropical climates to keep the above COMPOSITION for daily use, in order to destroy white ants and dry rot which are a source of great trouble to every household.

The principal actions of the COMPOSITION on wood are as follows:

The oily substances are easily soaked into the wood and will not only destroy the white ants and other wood destroying insects that are actually there, but will prevent others from attacking wood so coated.

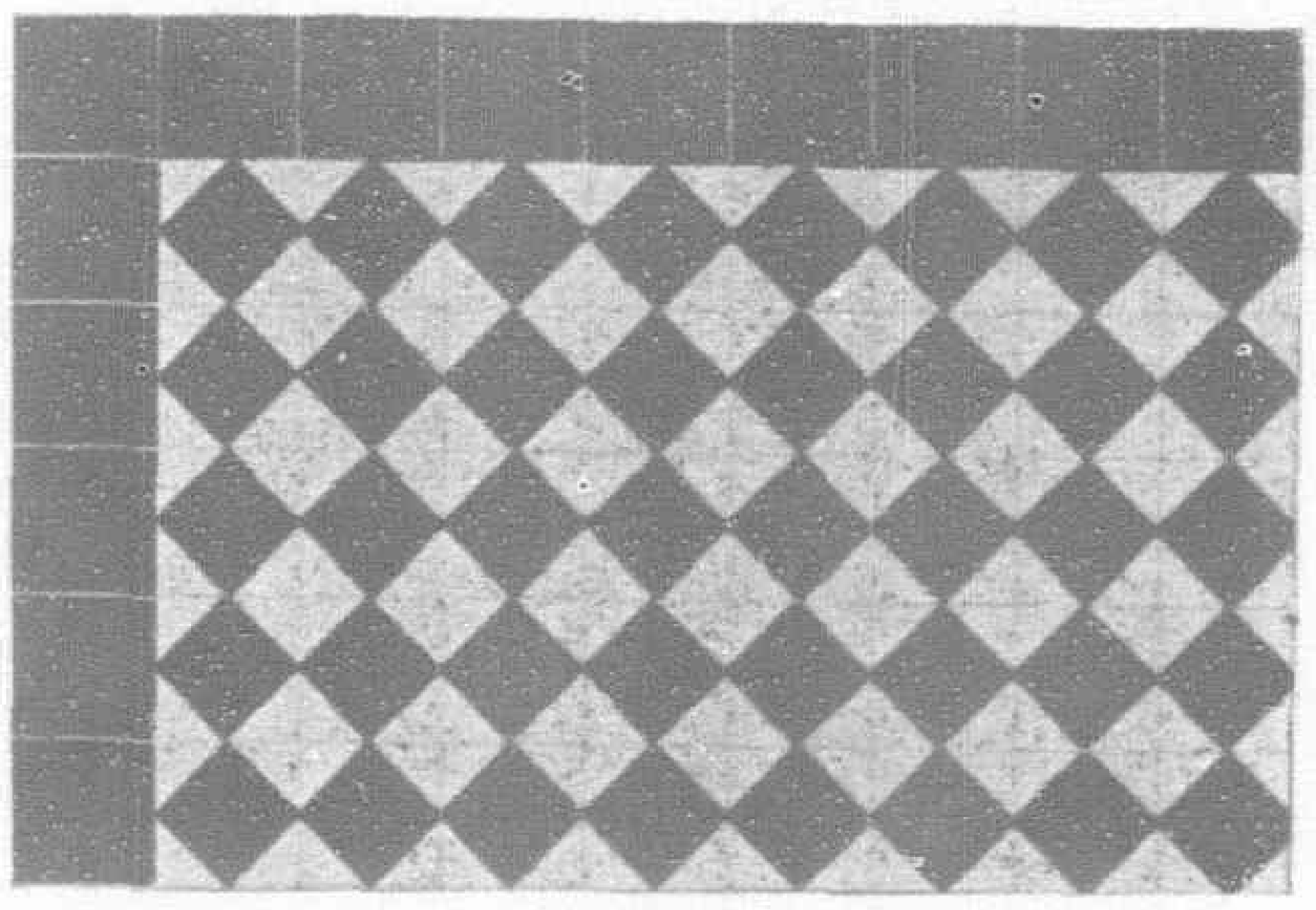
It has a preserving and disinfecting action on the wood and protects the same from decay and dry rot.

Trade-Mark

APPLICATION:—The application is extremely simple and may be performed by any unskilled laborer. Take COMPOSITION and coat wood with a brush. It is advisable to coat wood a second time.

SPRUNGLI & CO.

28 DAVID **SOLE AGENTS** **MANILA, P. I.**



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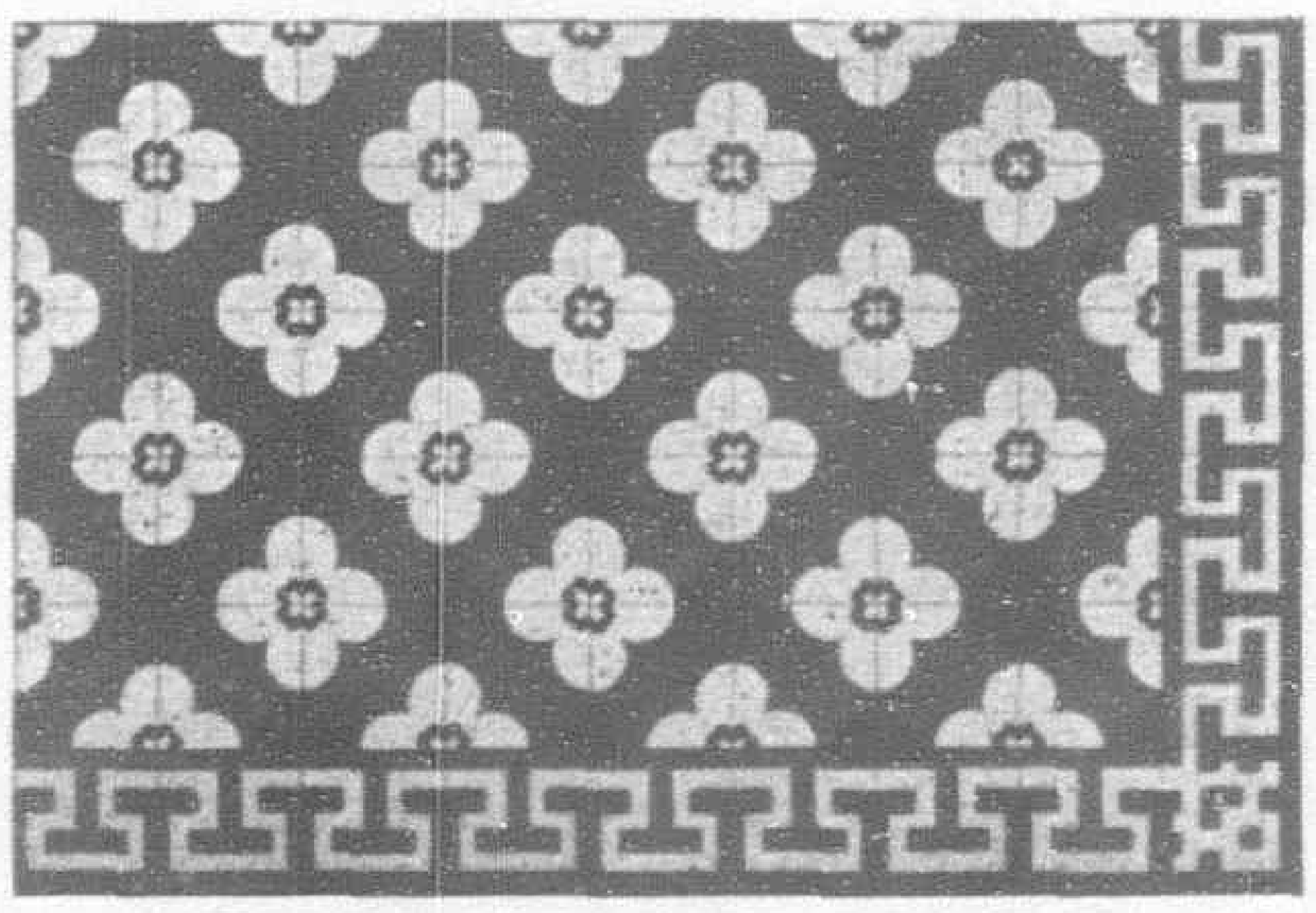

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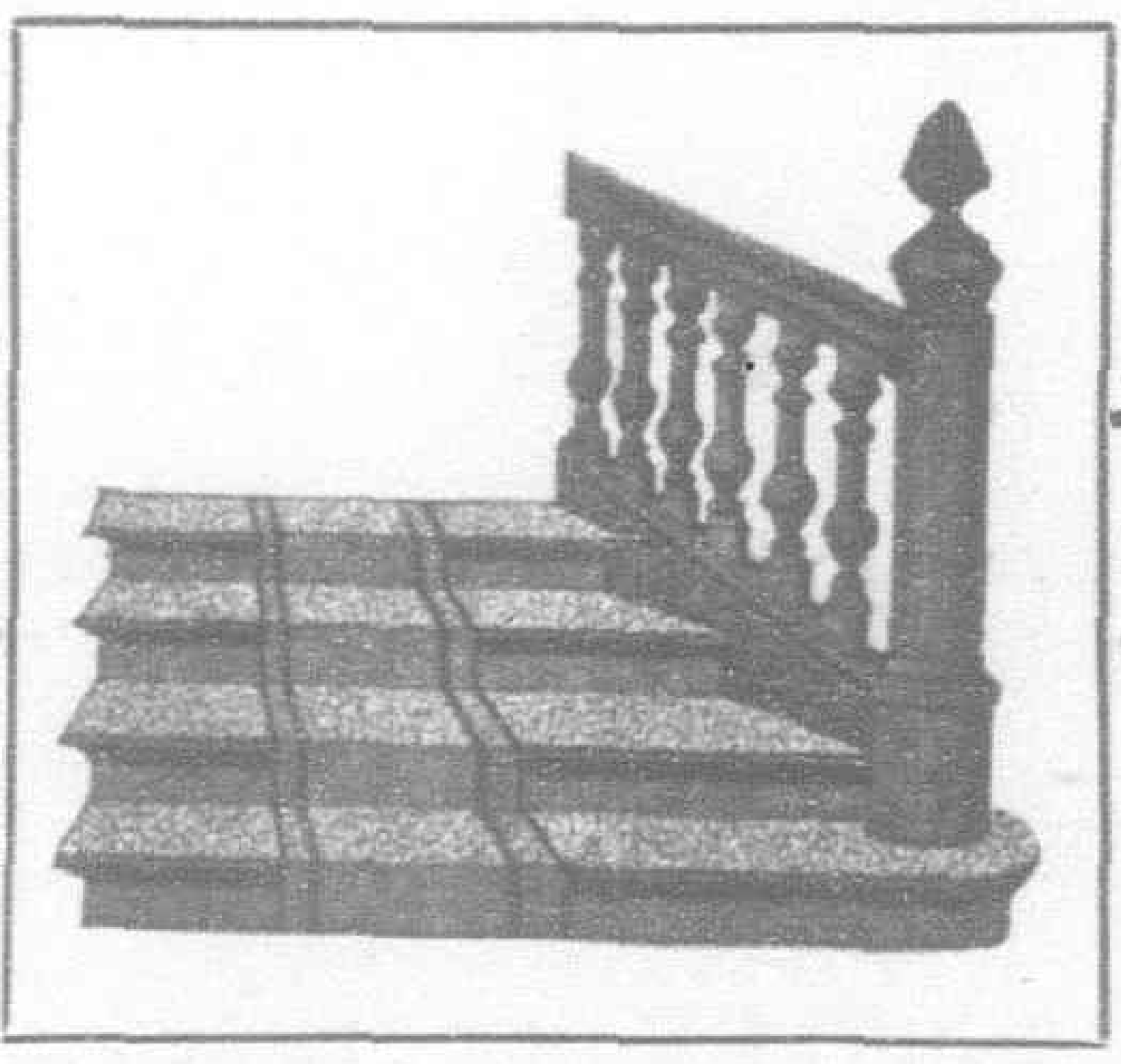

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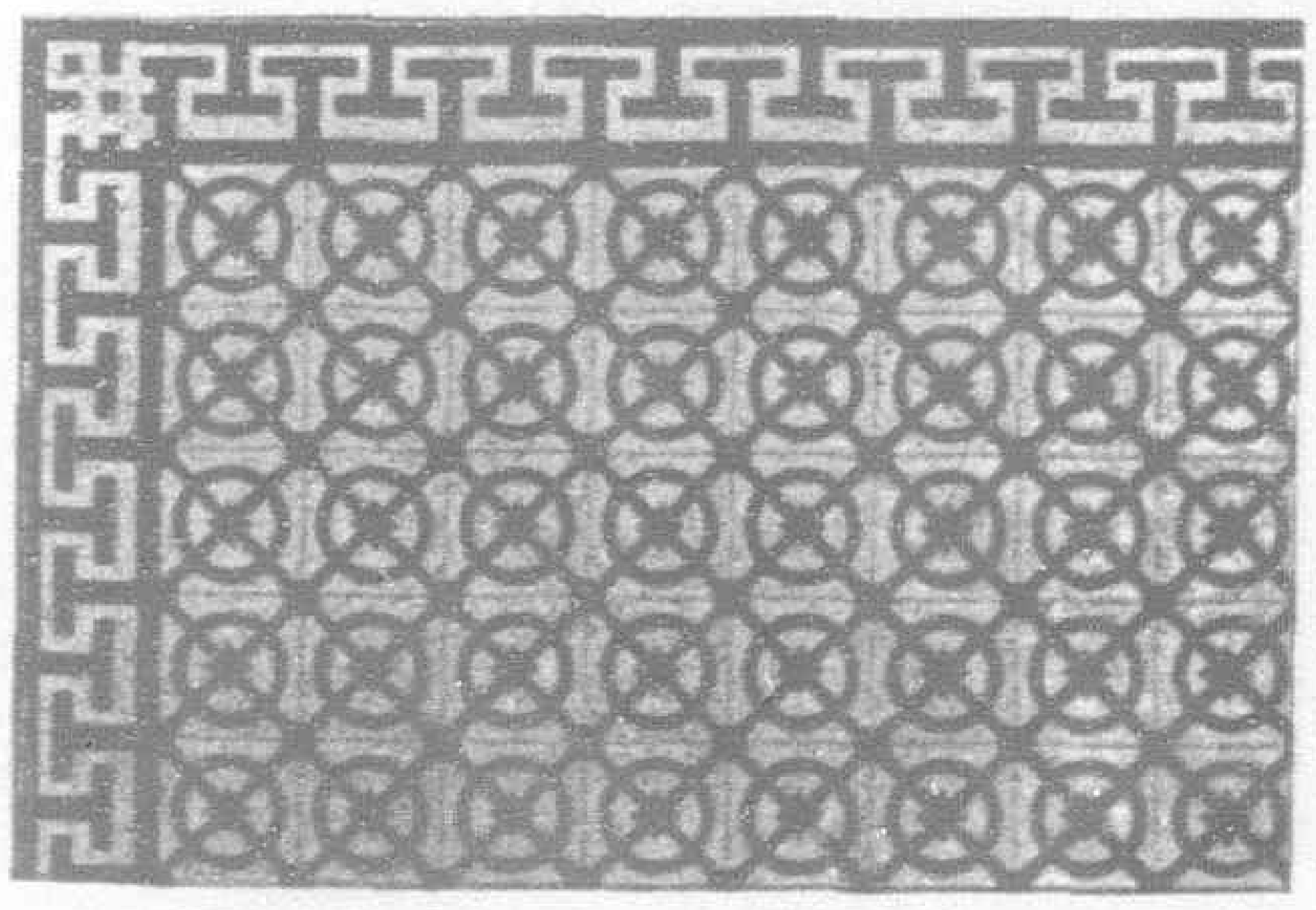

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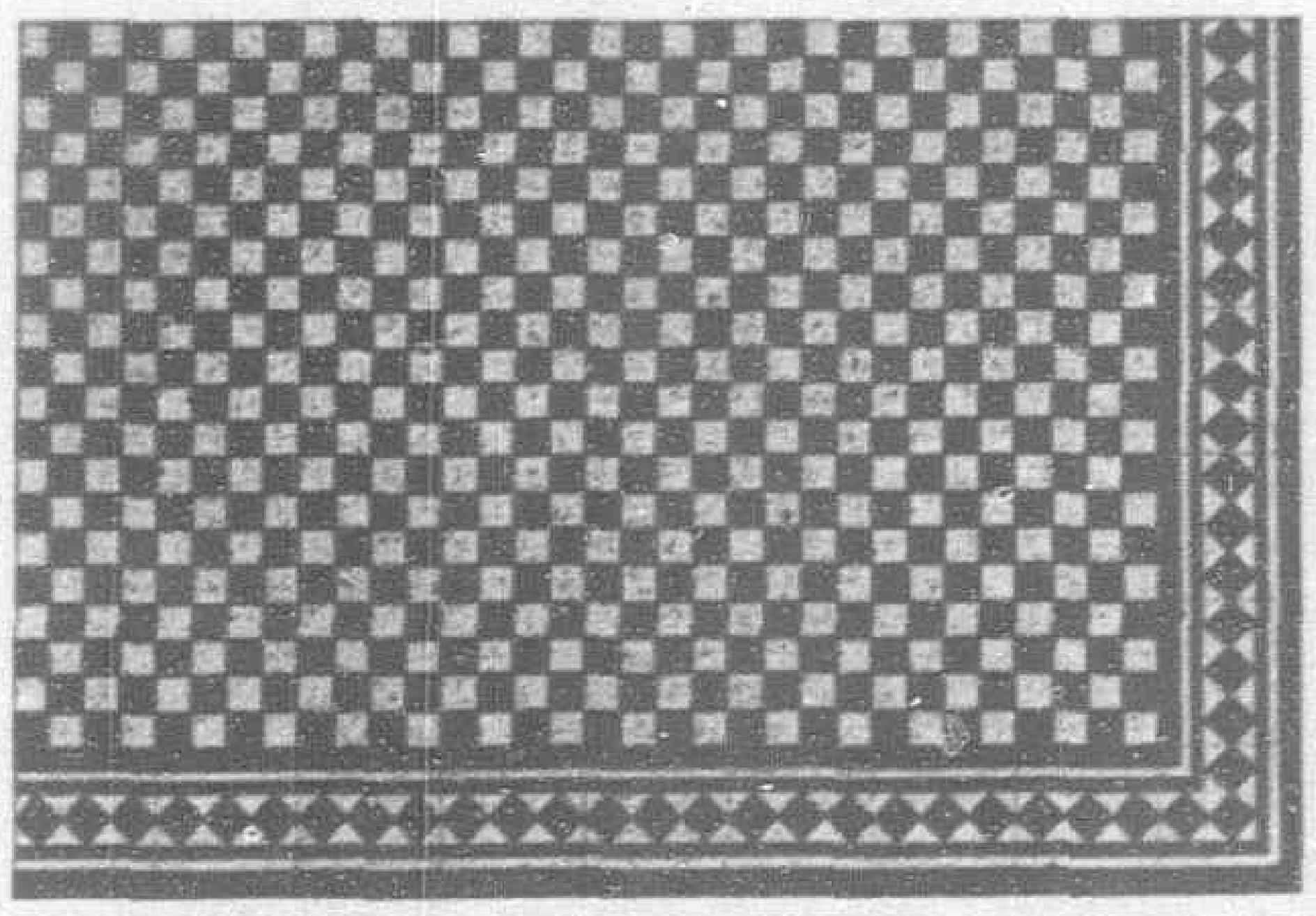

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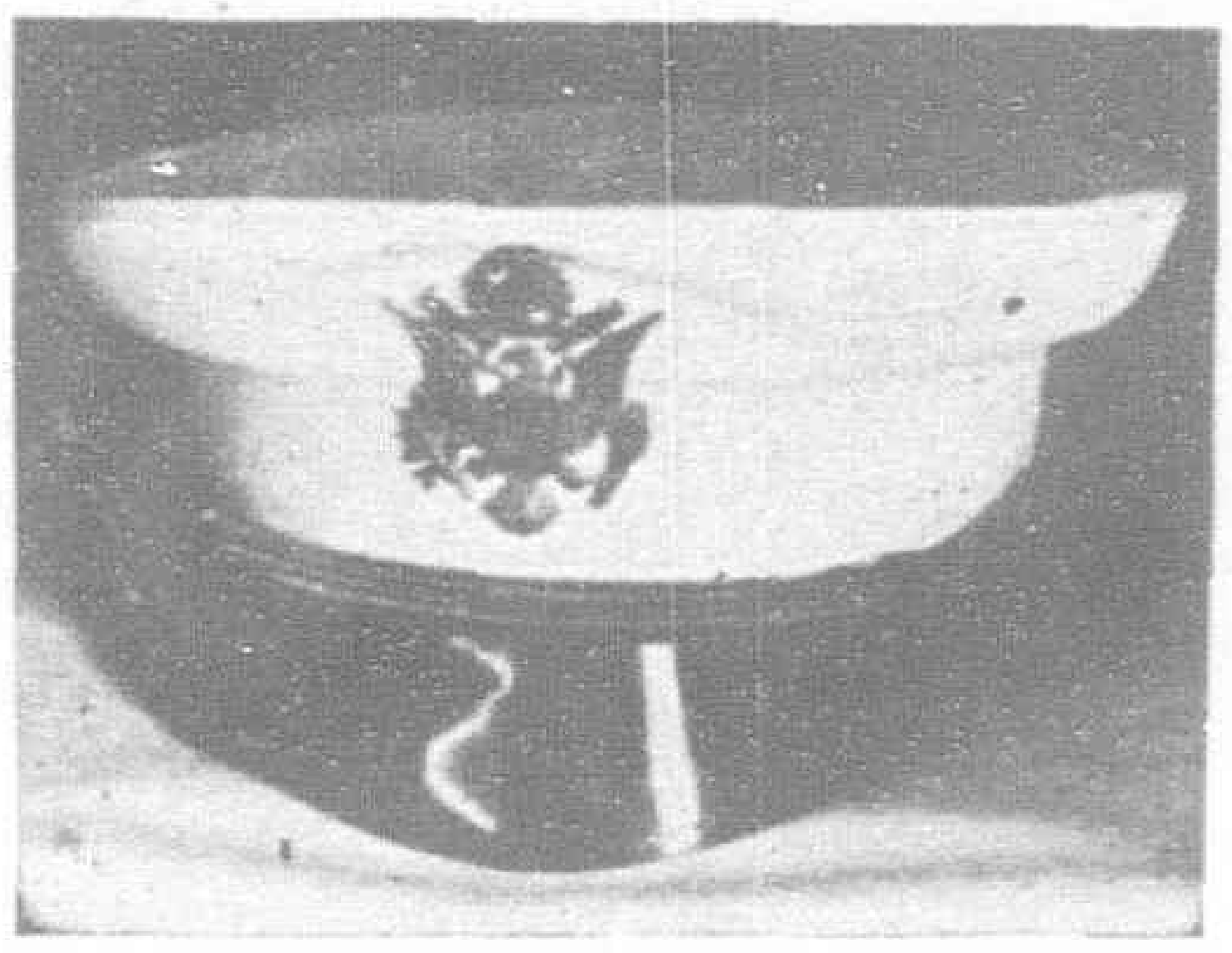

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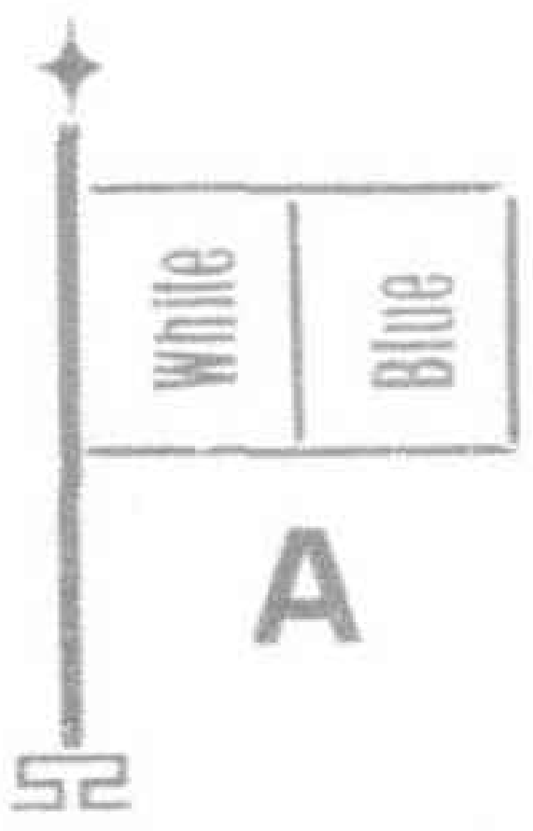

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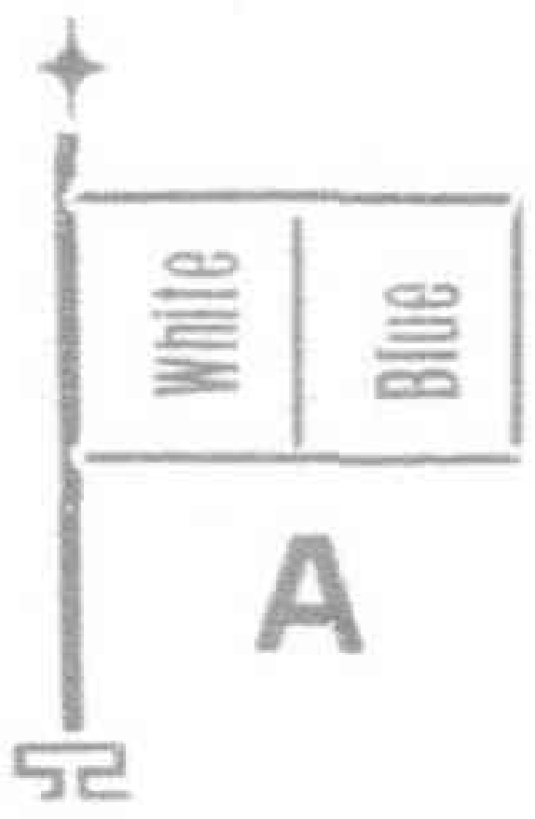

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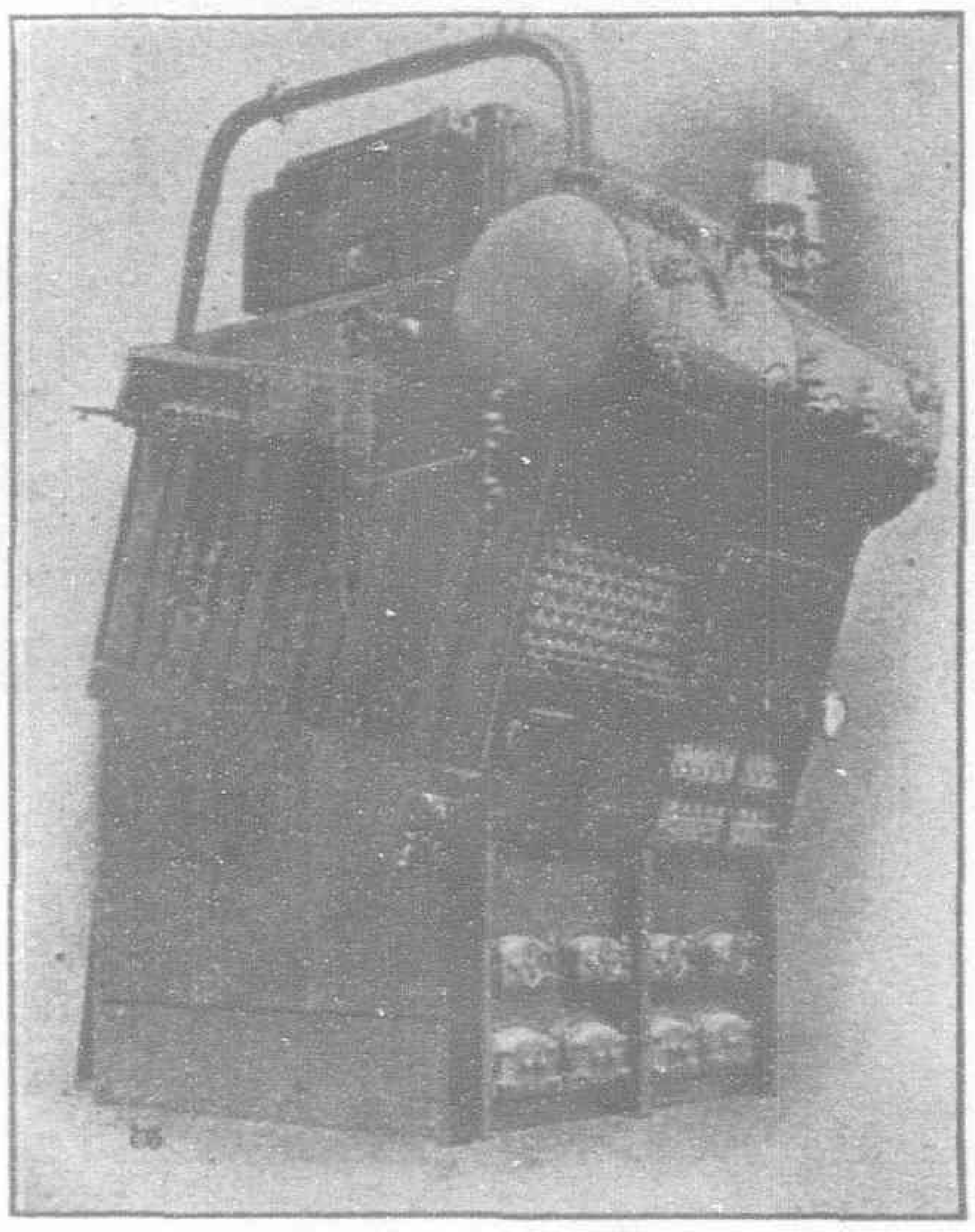

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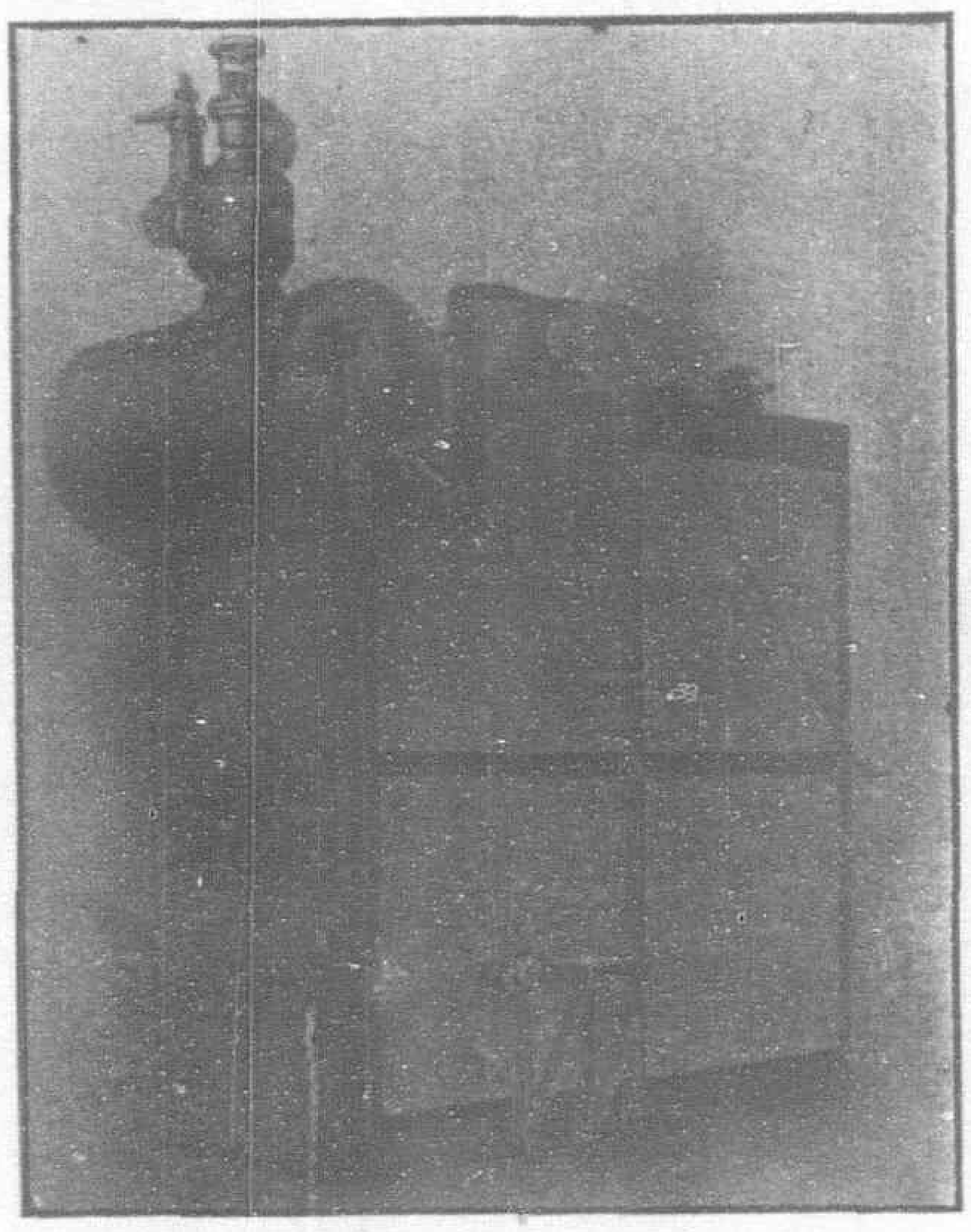

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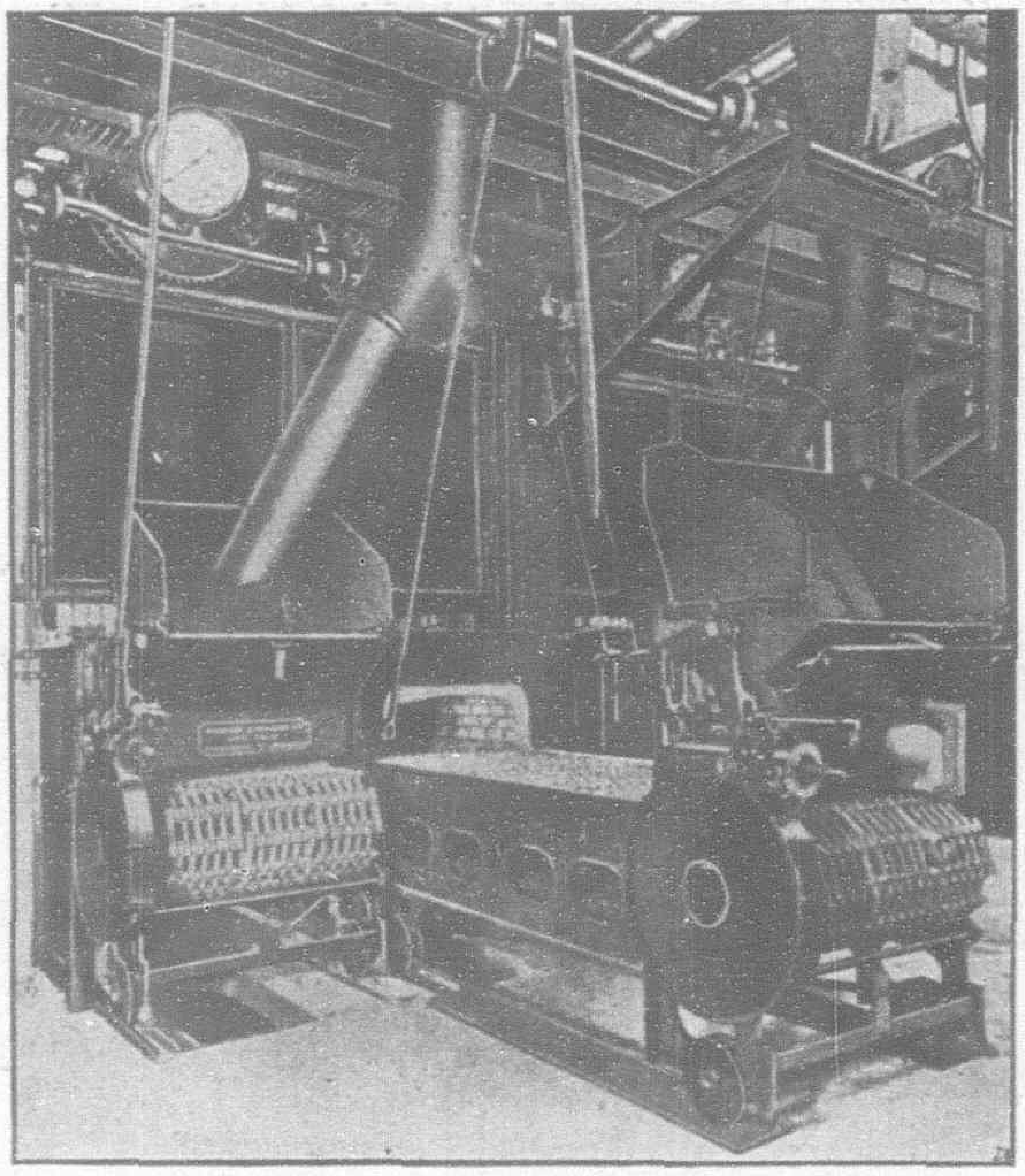

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Specially constructed for use in mountainous districts, and shipped in small packages of light weight, no parcel exceeding two hundred lbs. in weight for easy transport by Cart, Coolies or Mule-back.

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As supplied to the Pekin Syndicate Mines in Honan can be sectionalized so that no piece exceeds two hundred and fifty lbs. in weight.

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Specially suitable for light draught and river steamers, where economy in weight and space is of importance.

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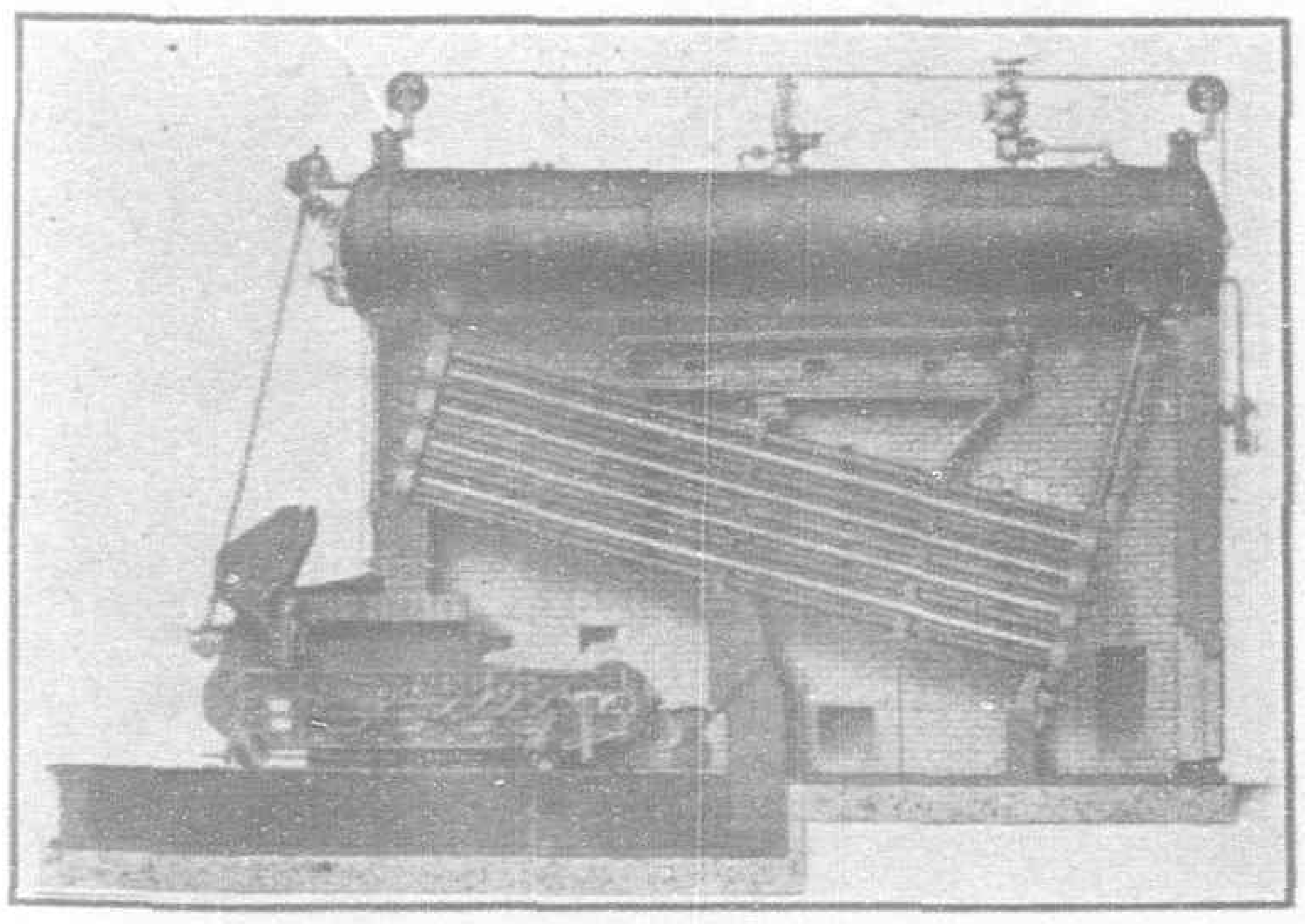

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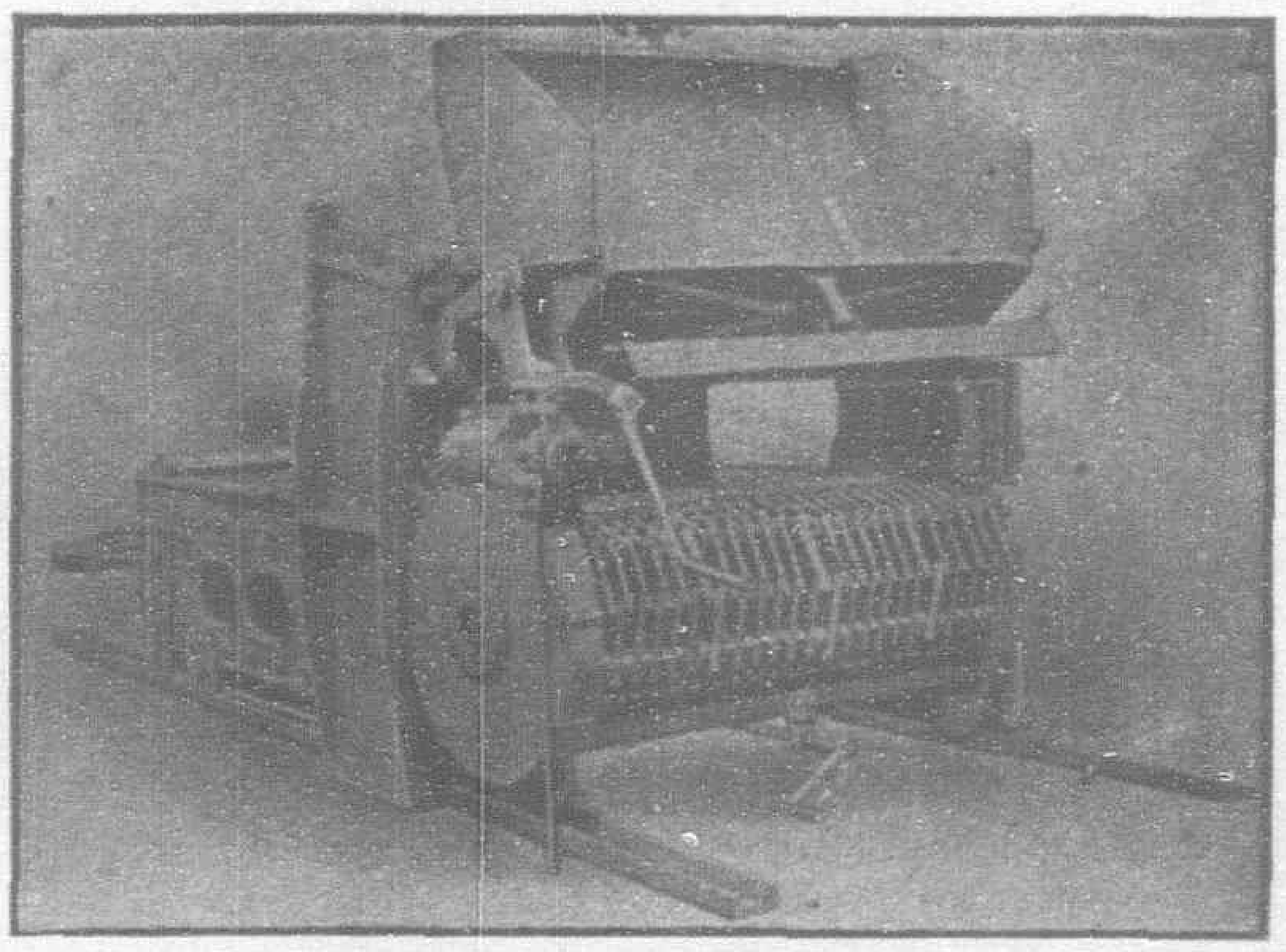

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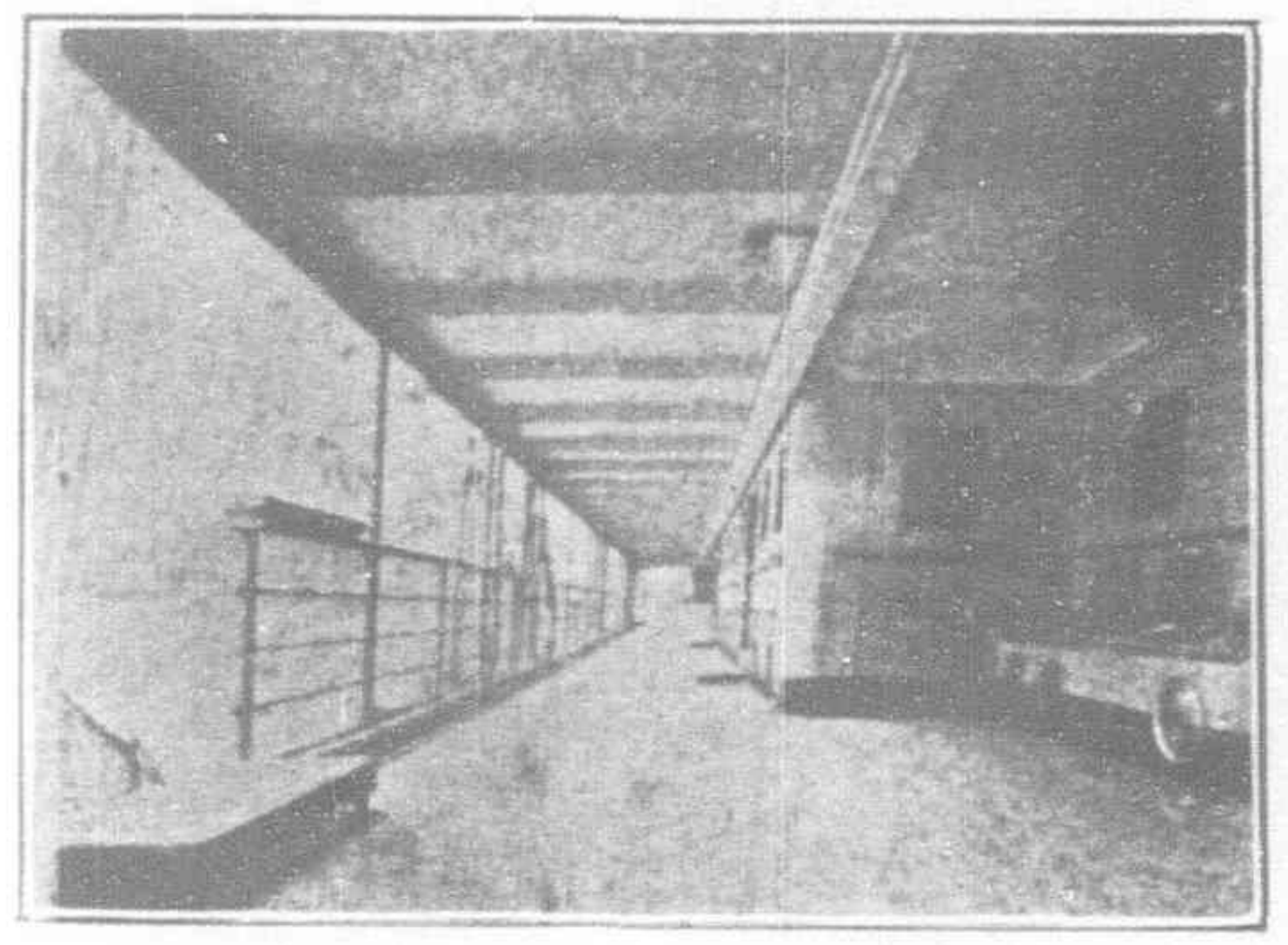

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"ZAFIRO" "RUBI"

WEEKLY SAILINGS. ONLY TWO NIGHTS AT SEA

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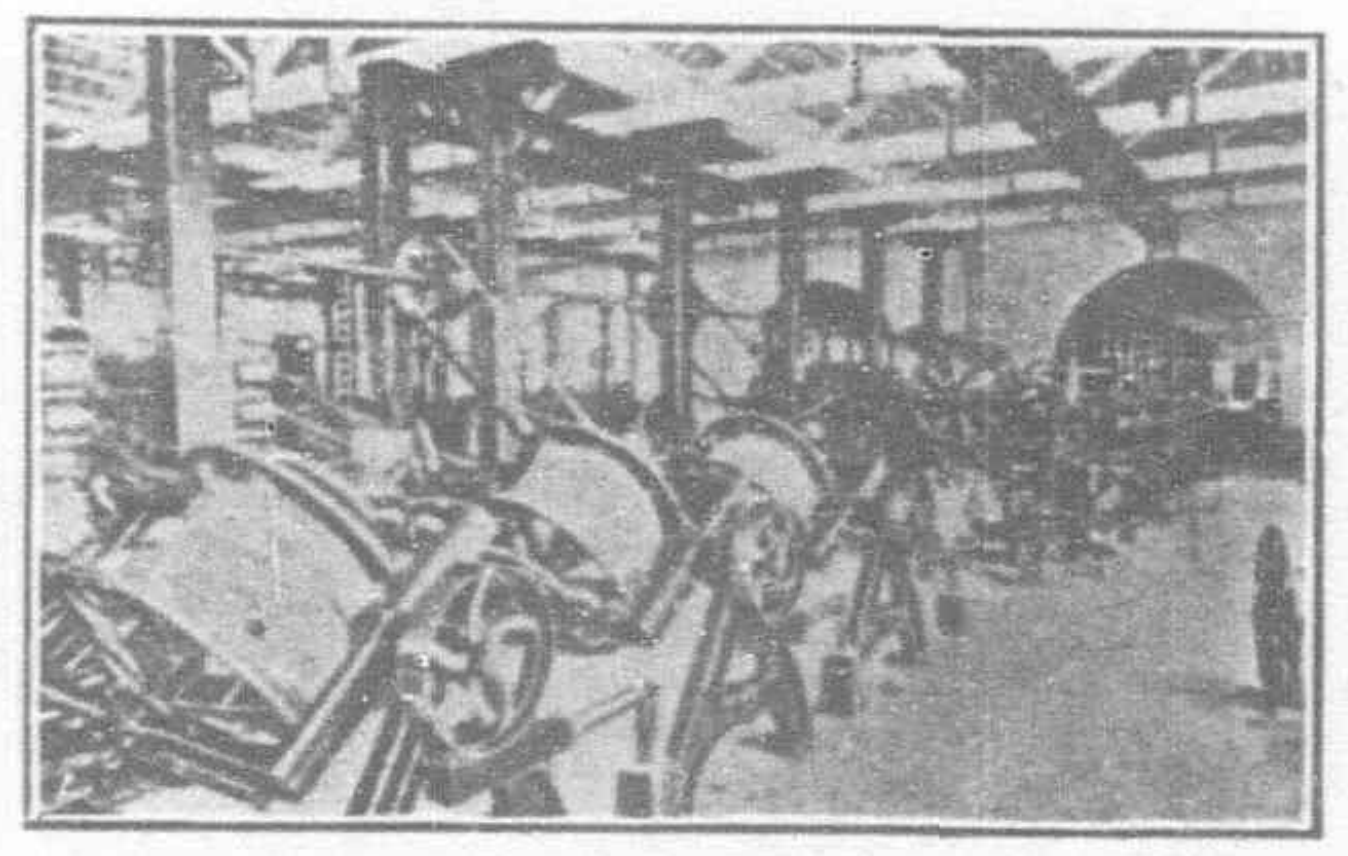

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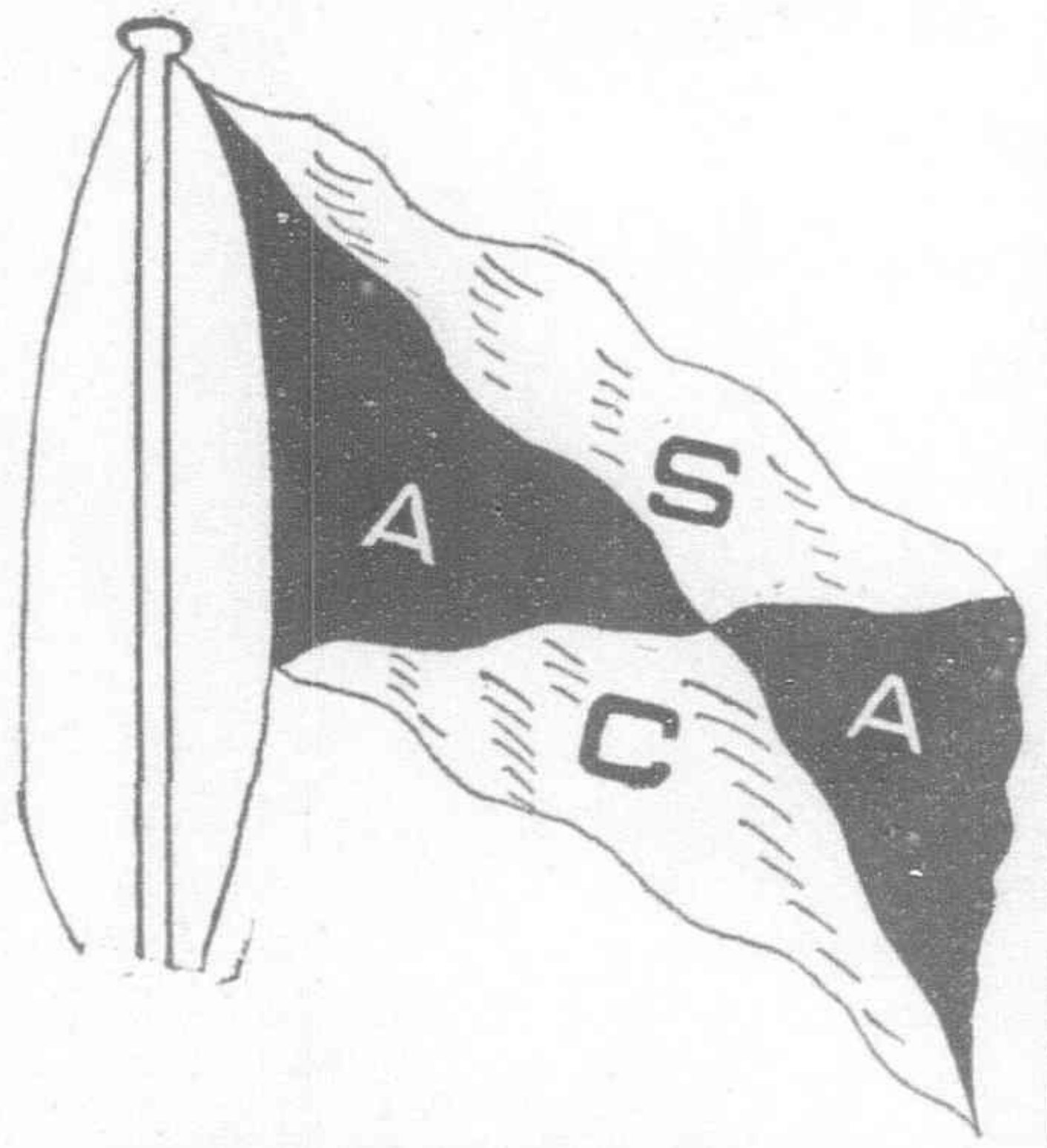

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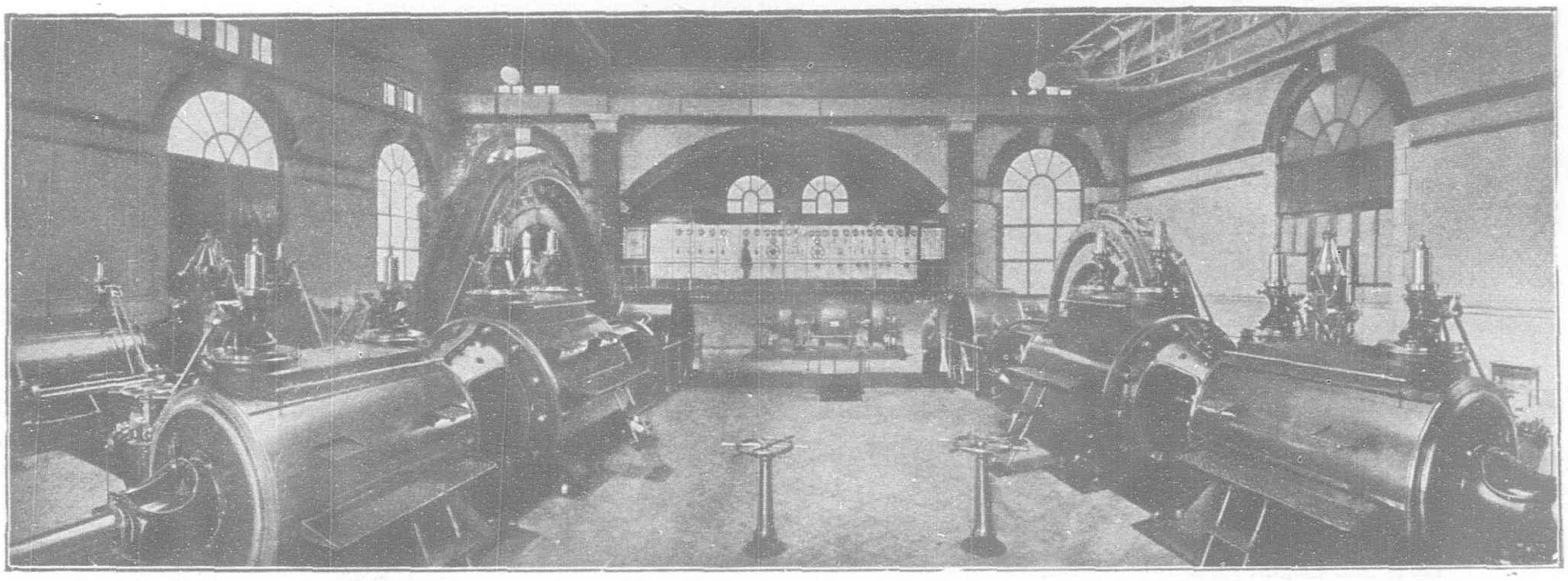

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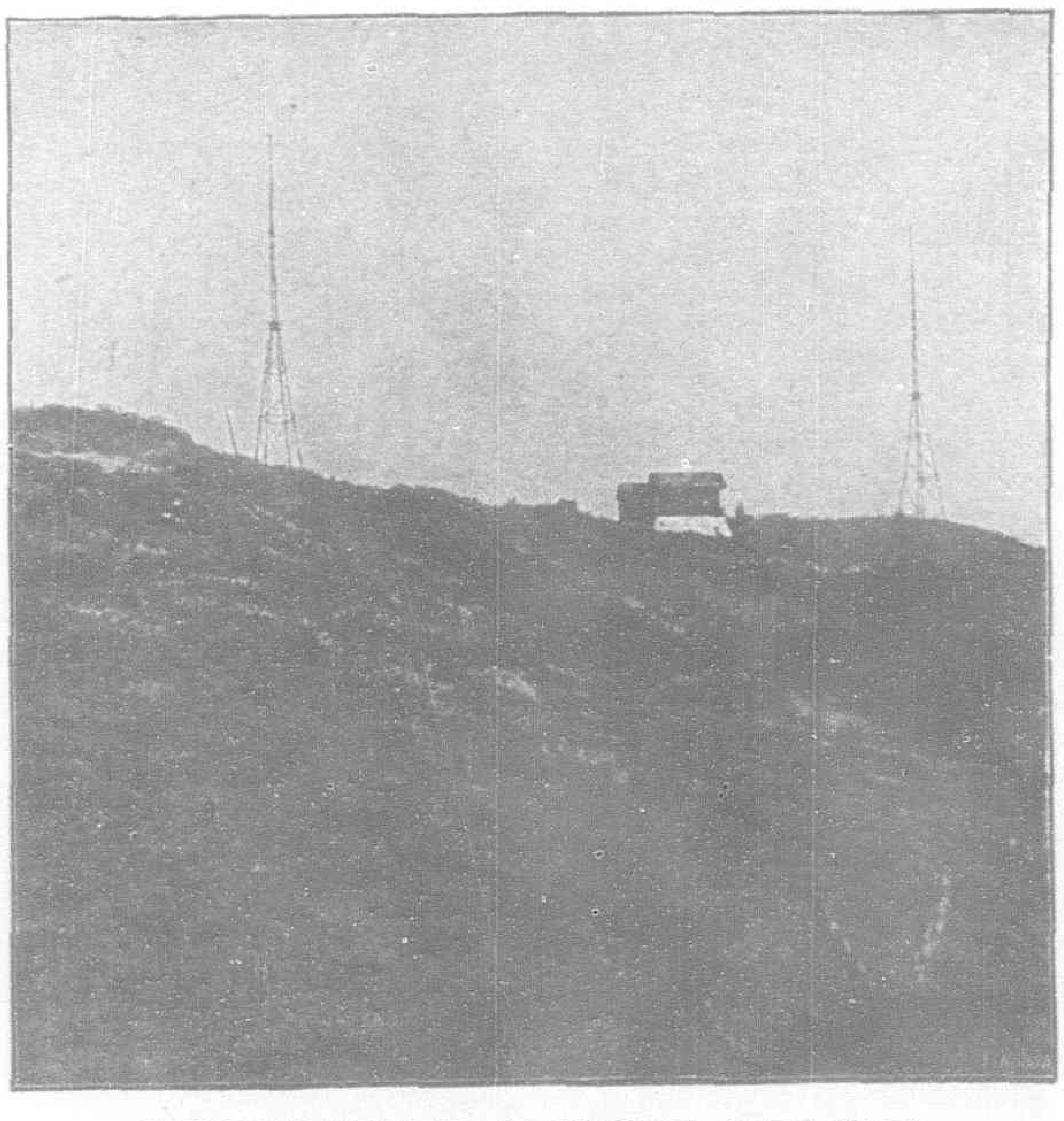

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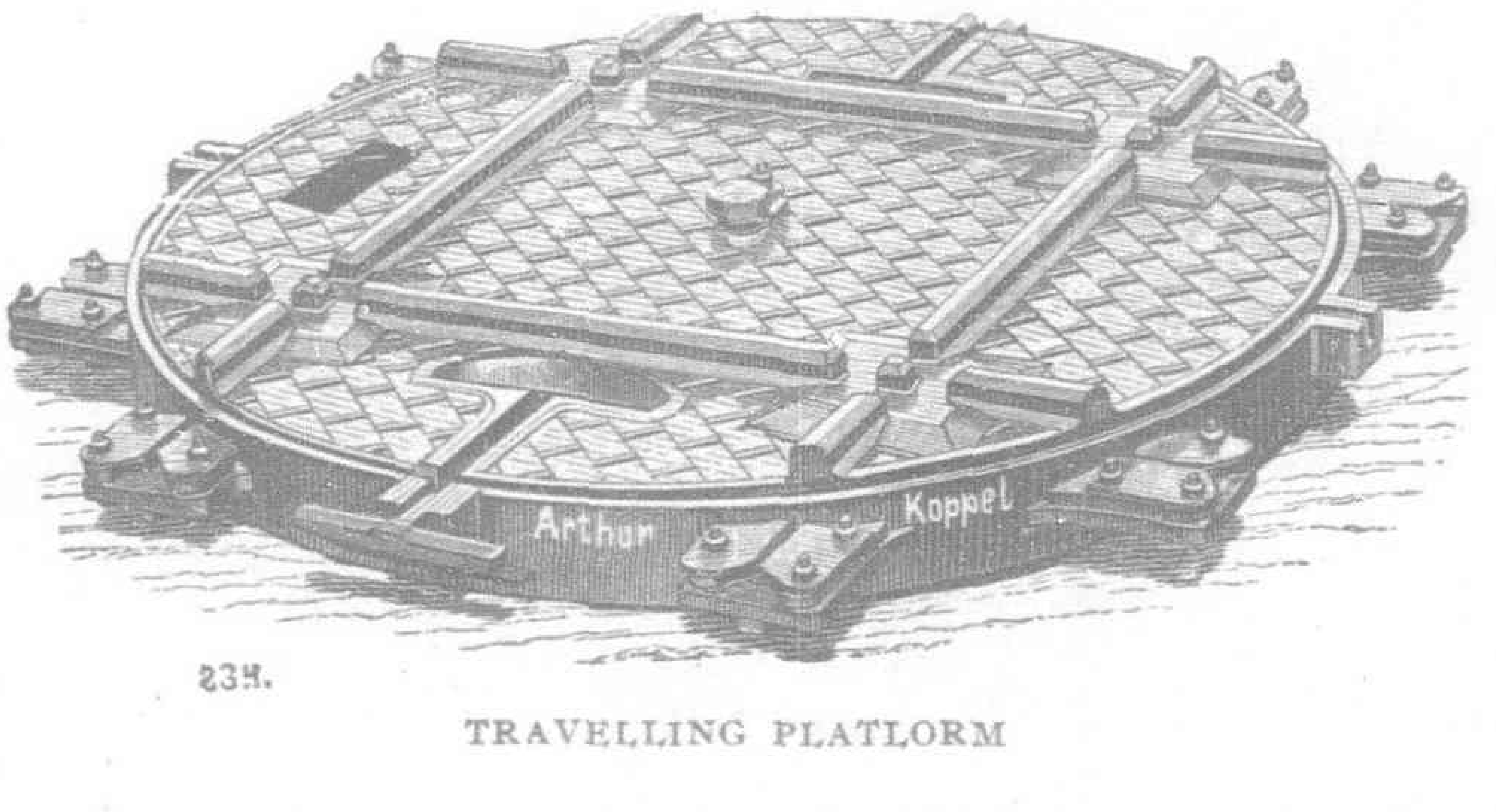
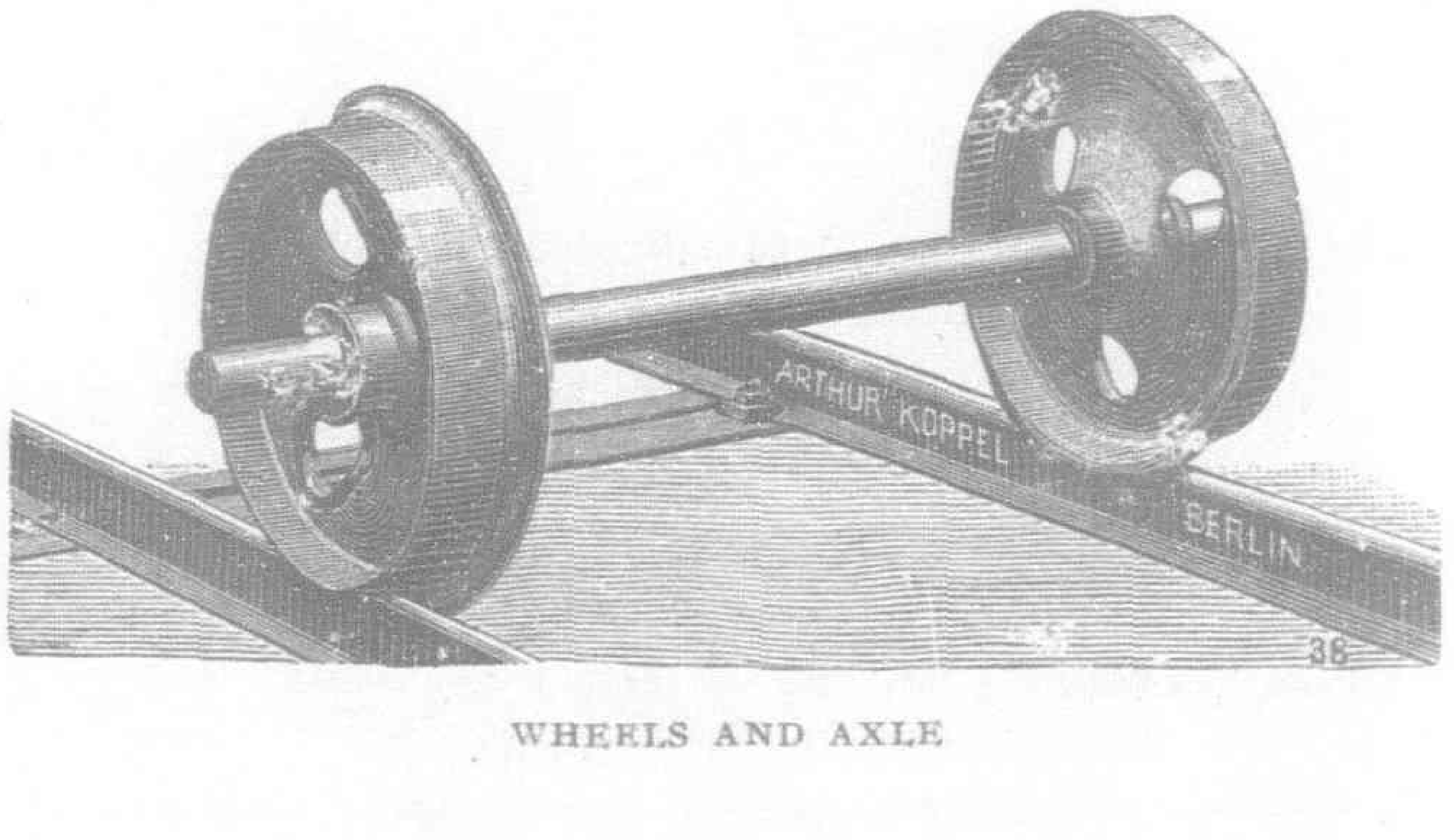


TRAVELLING PLATLORM



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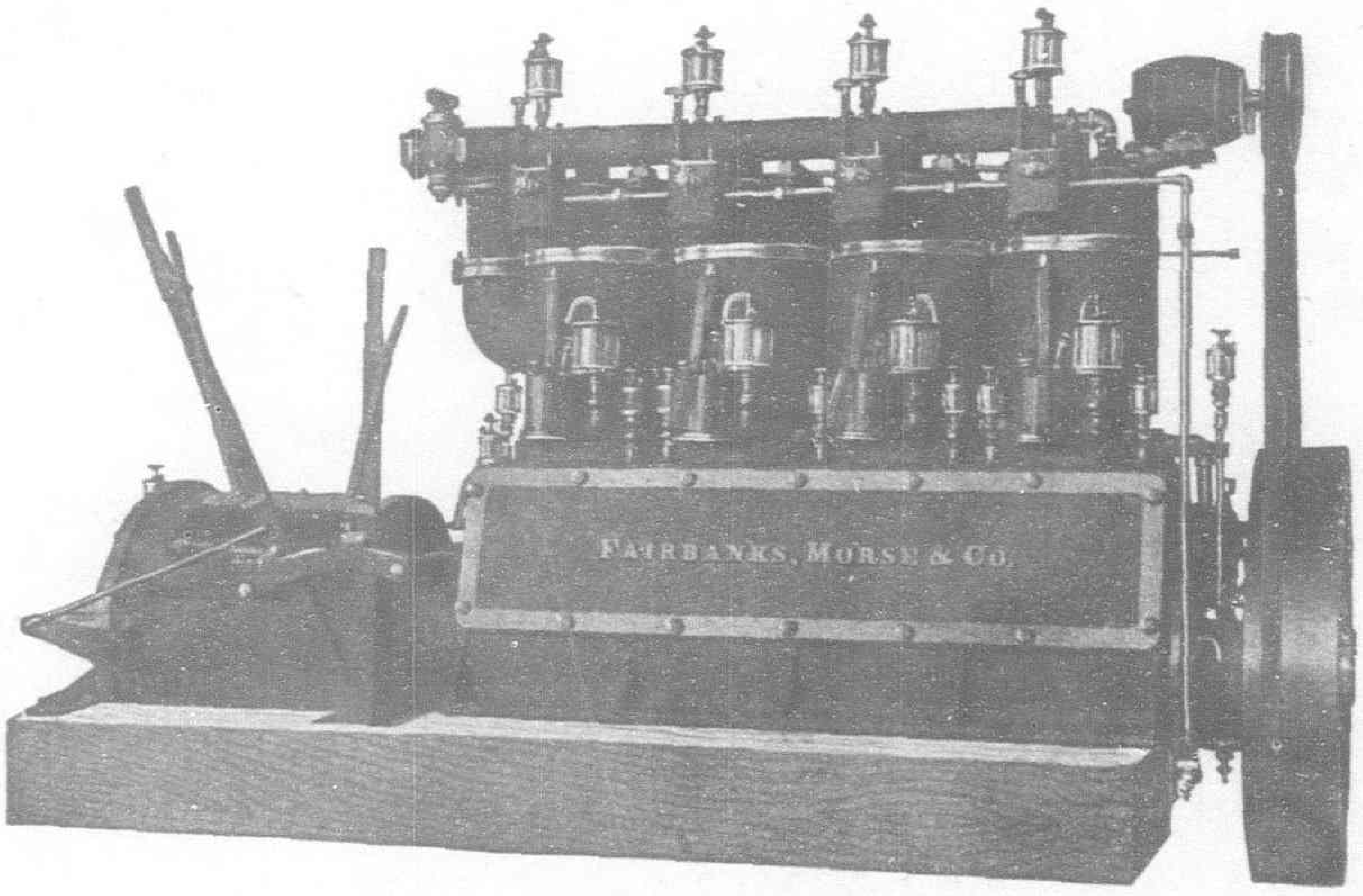

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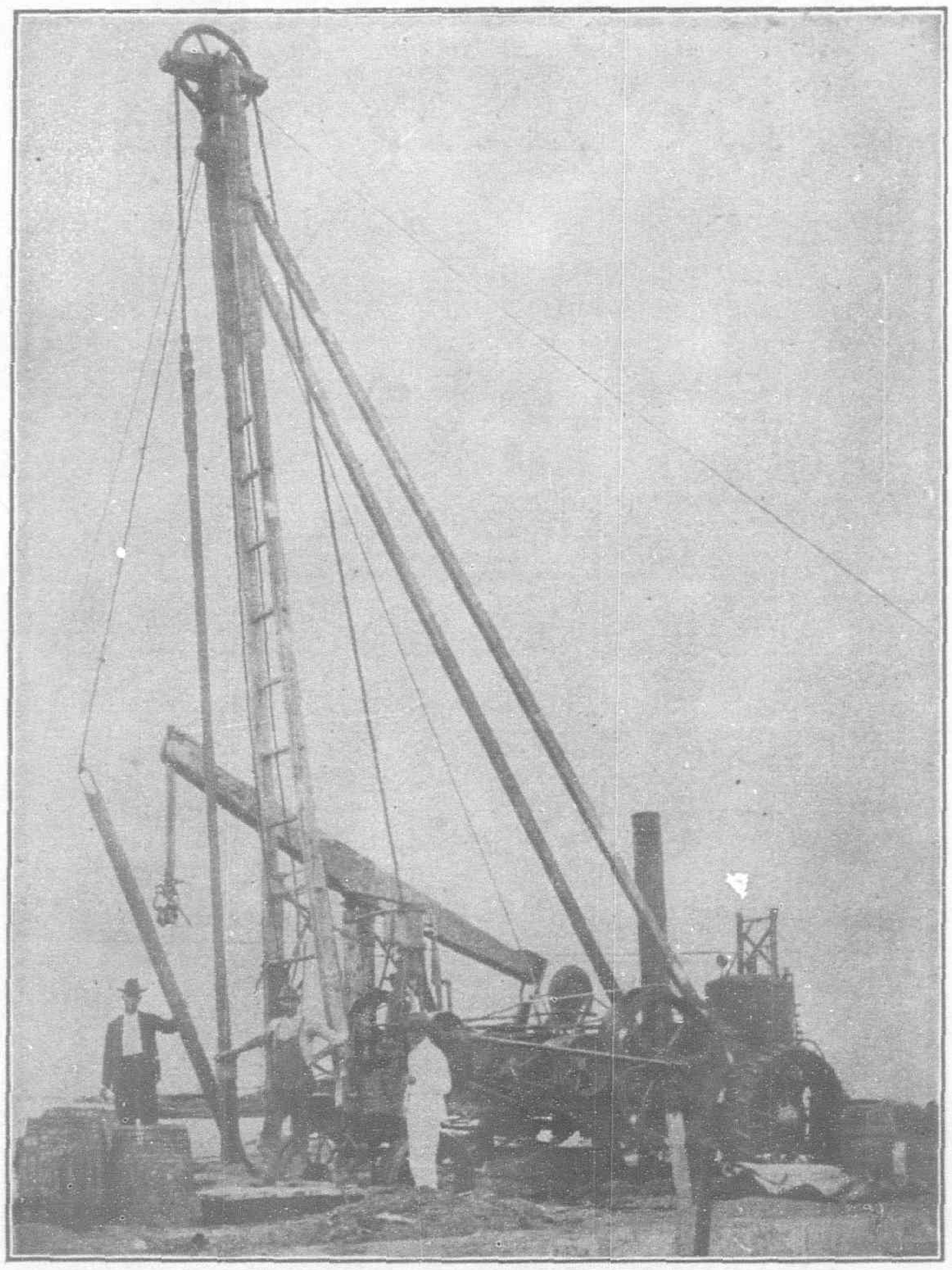

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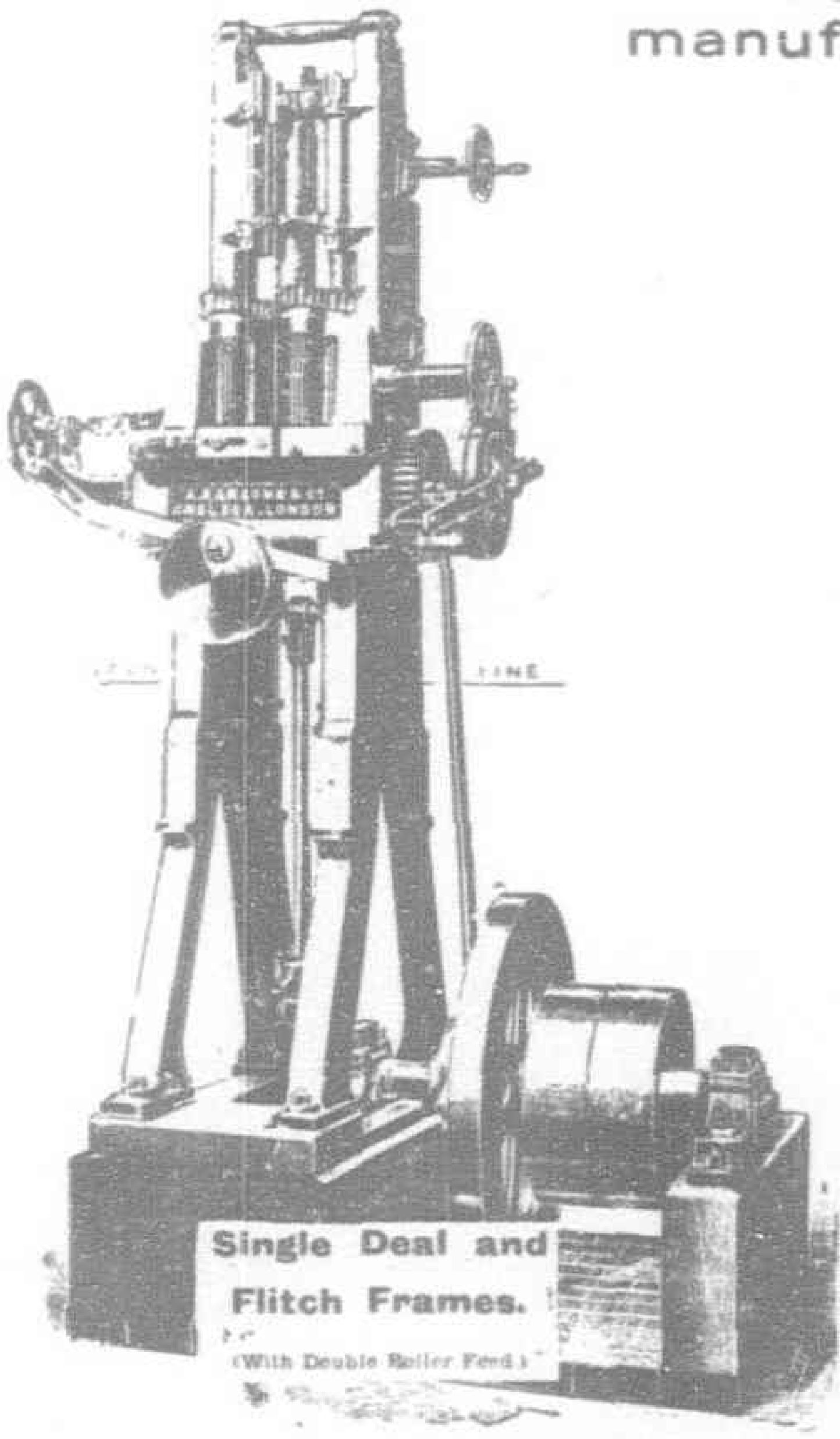

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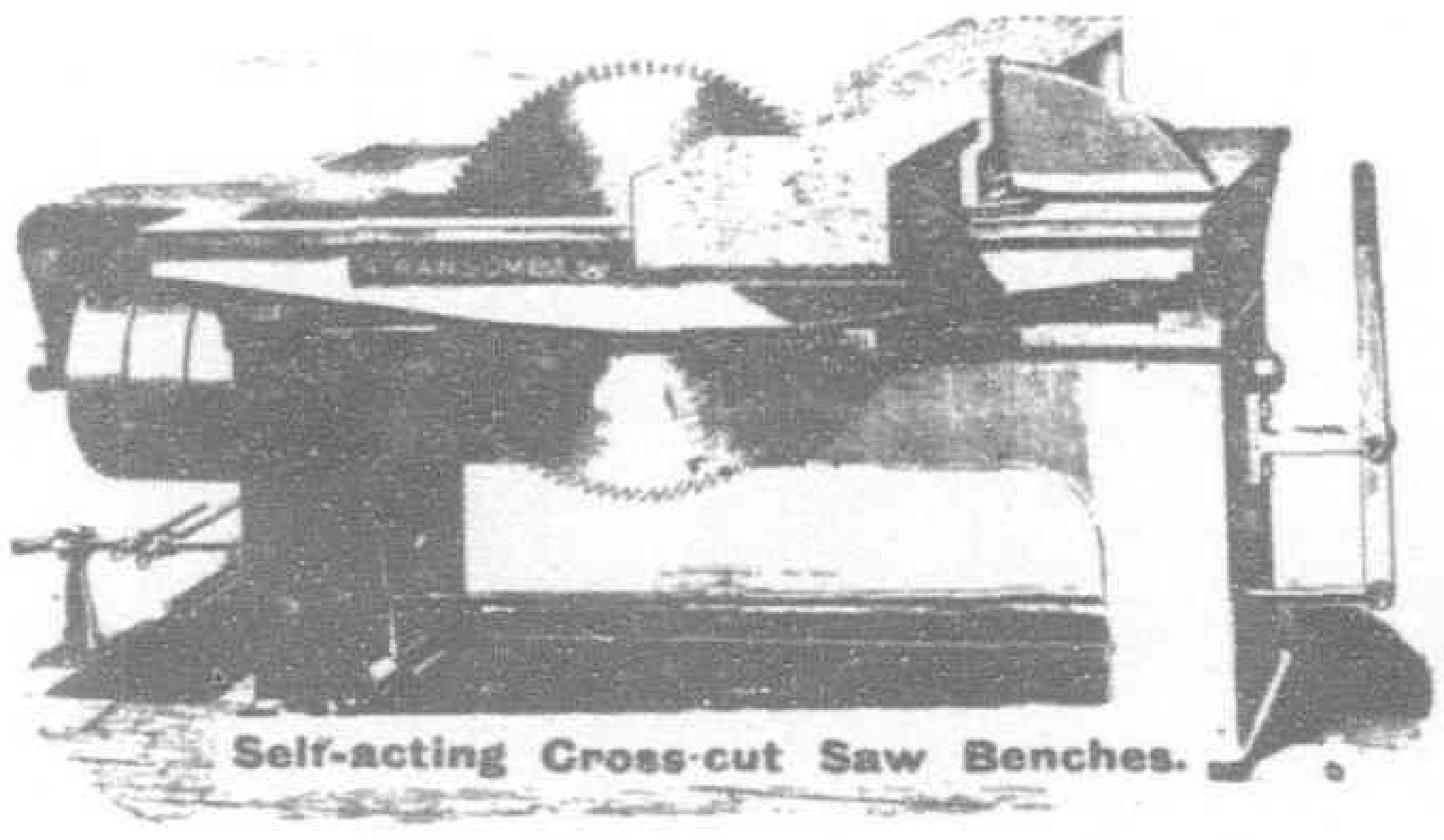

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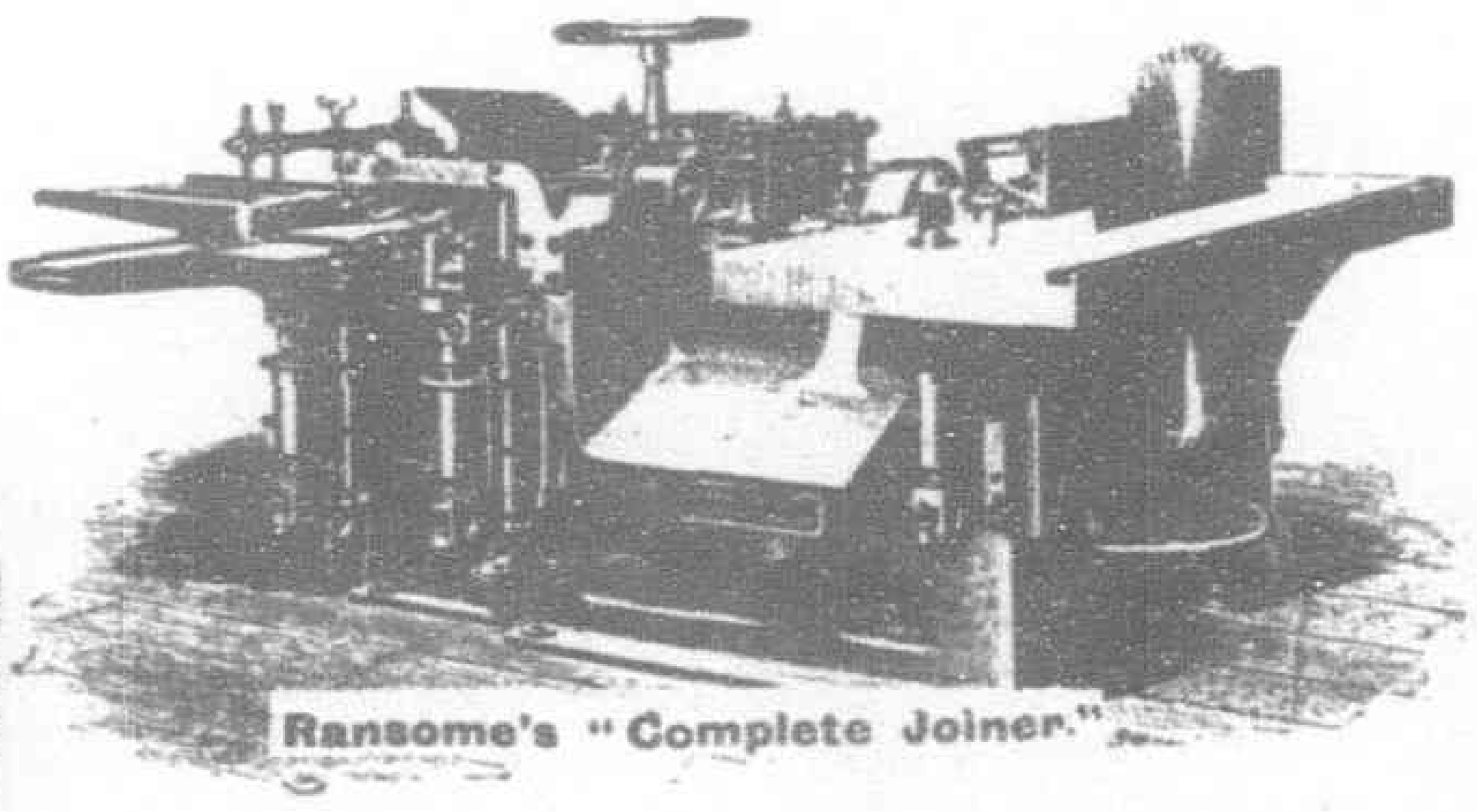

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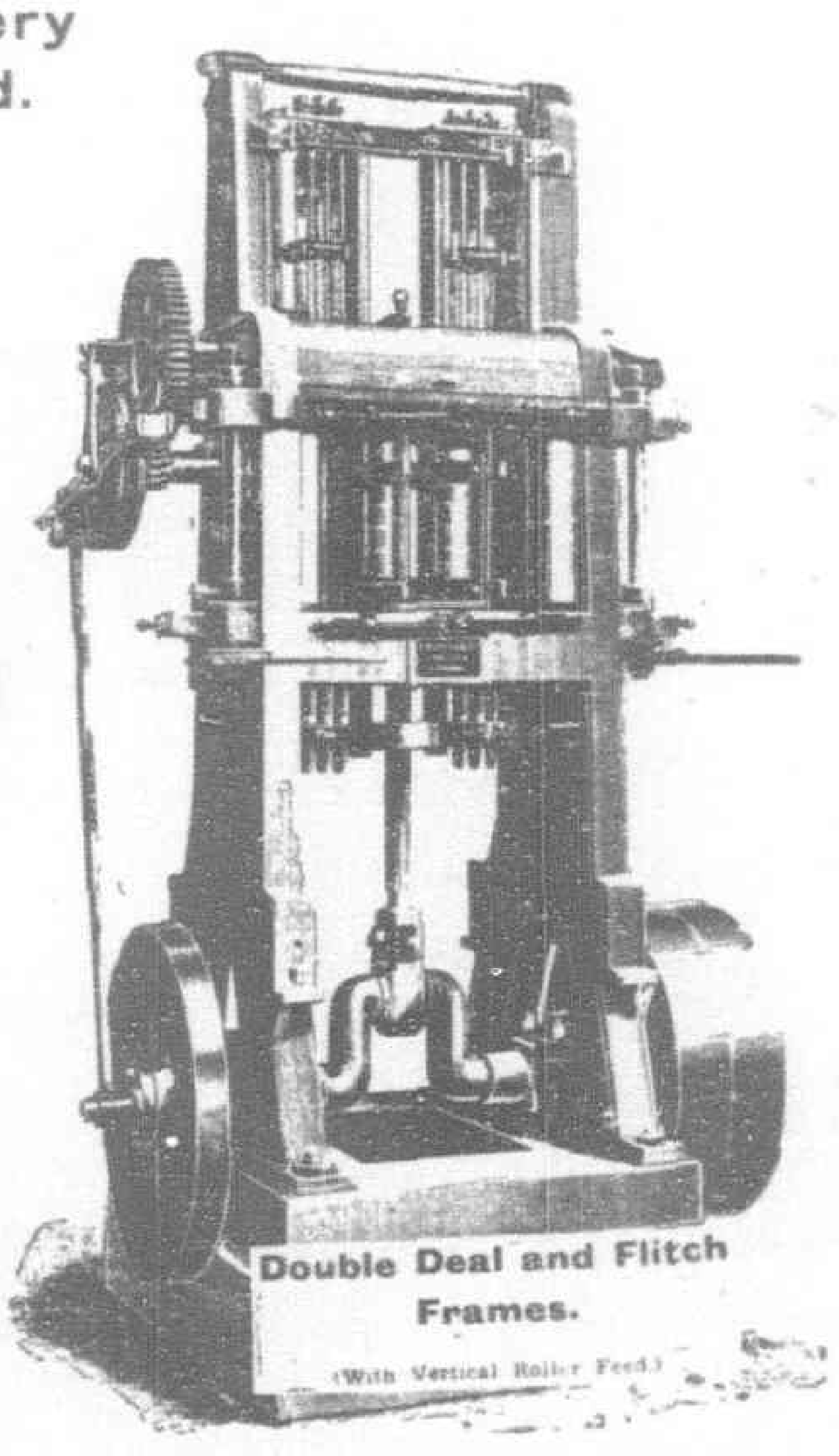

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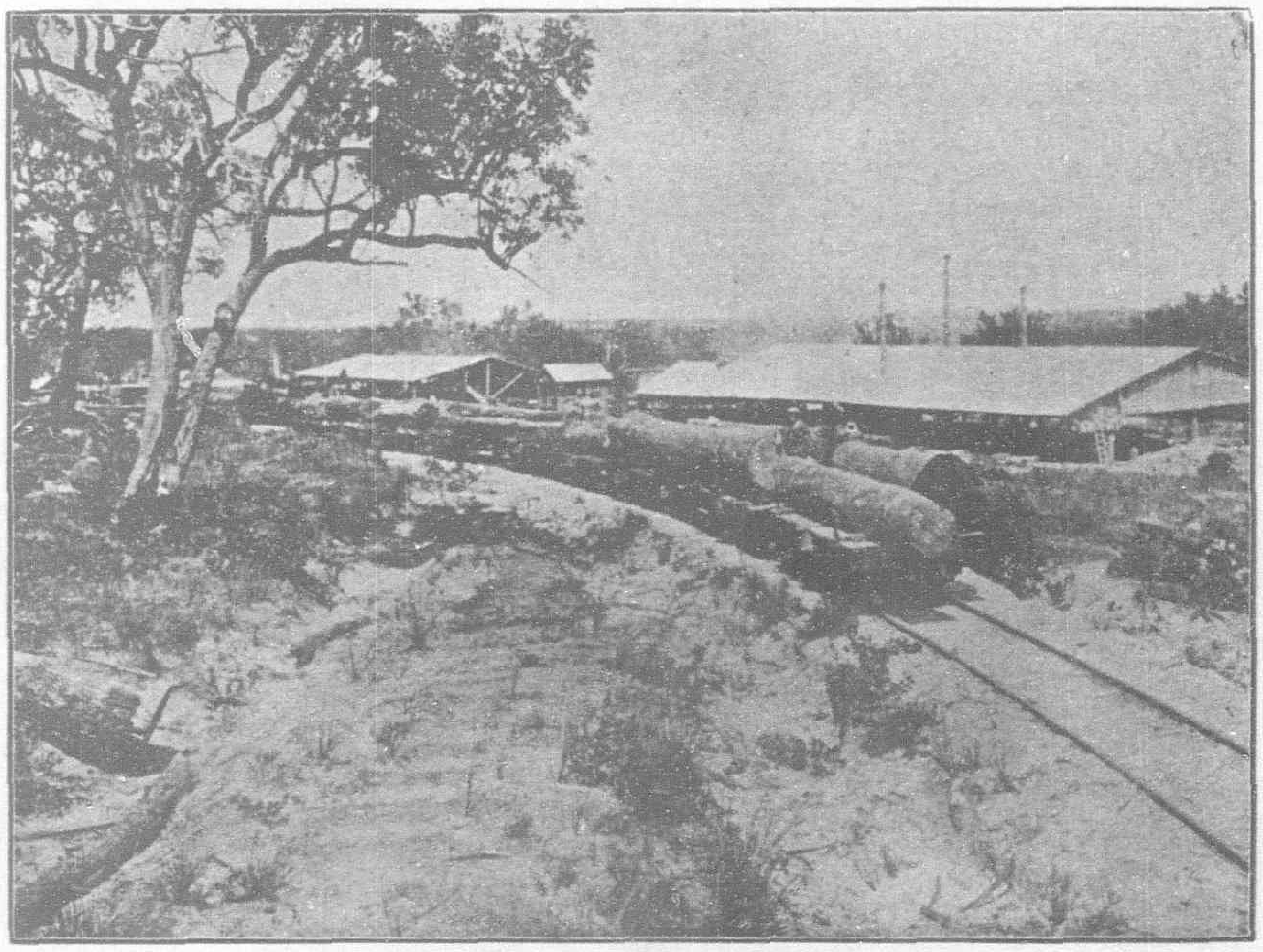

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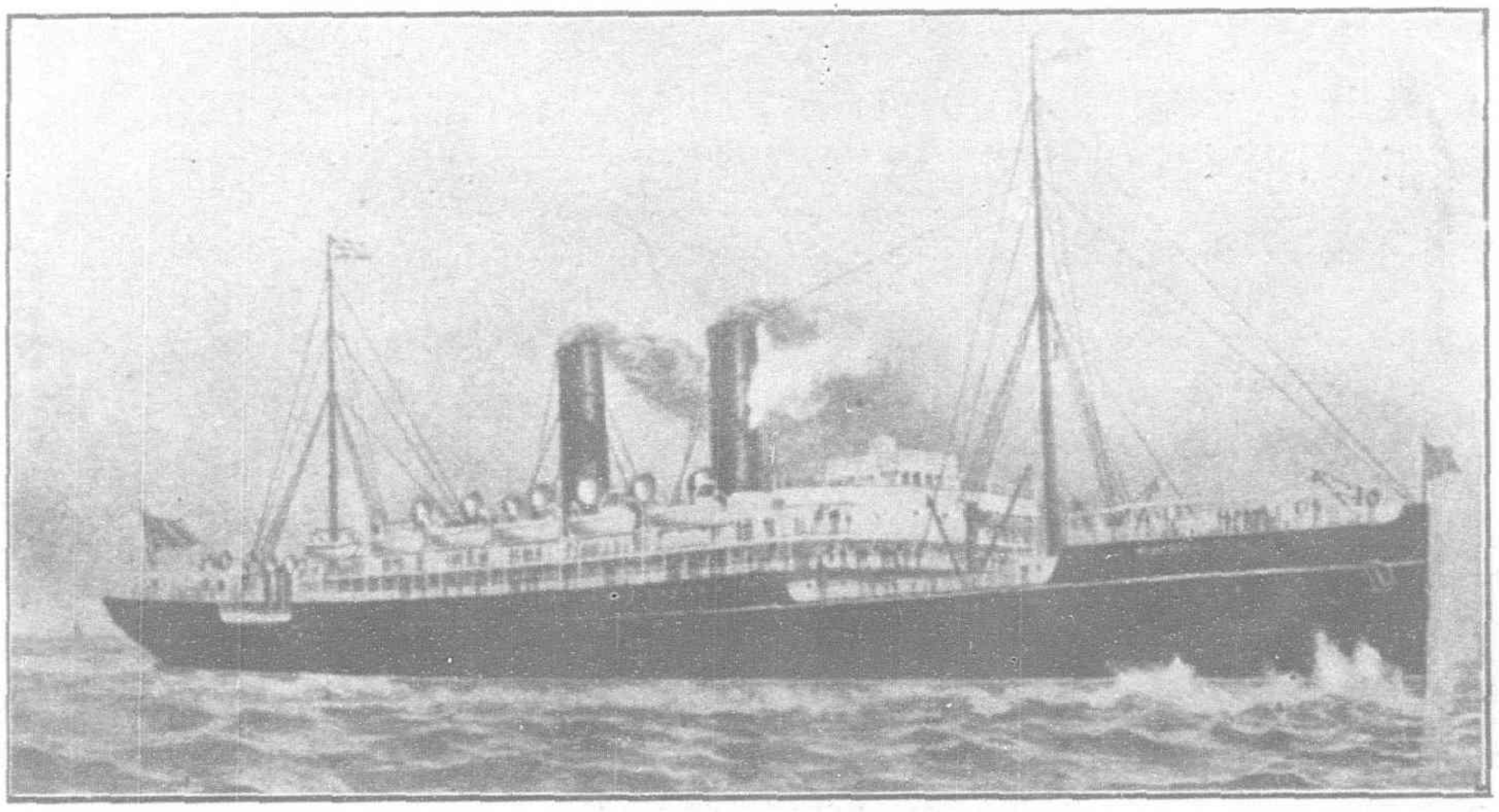

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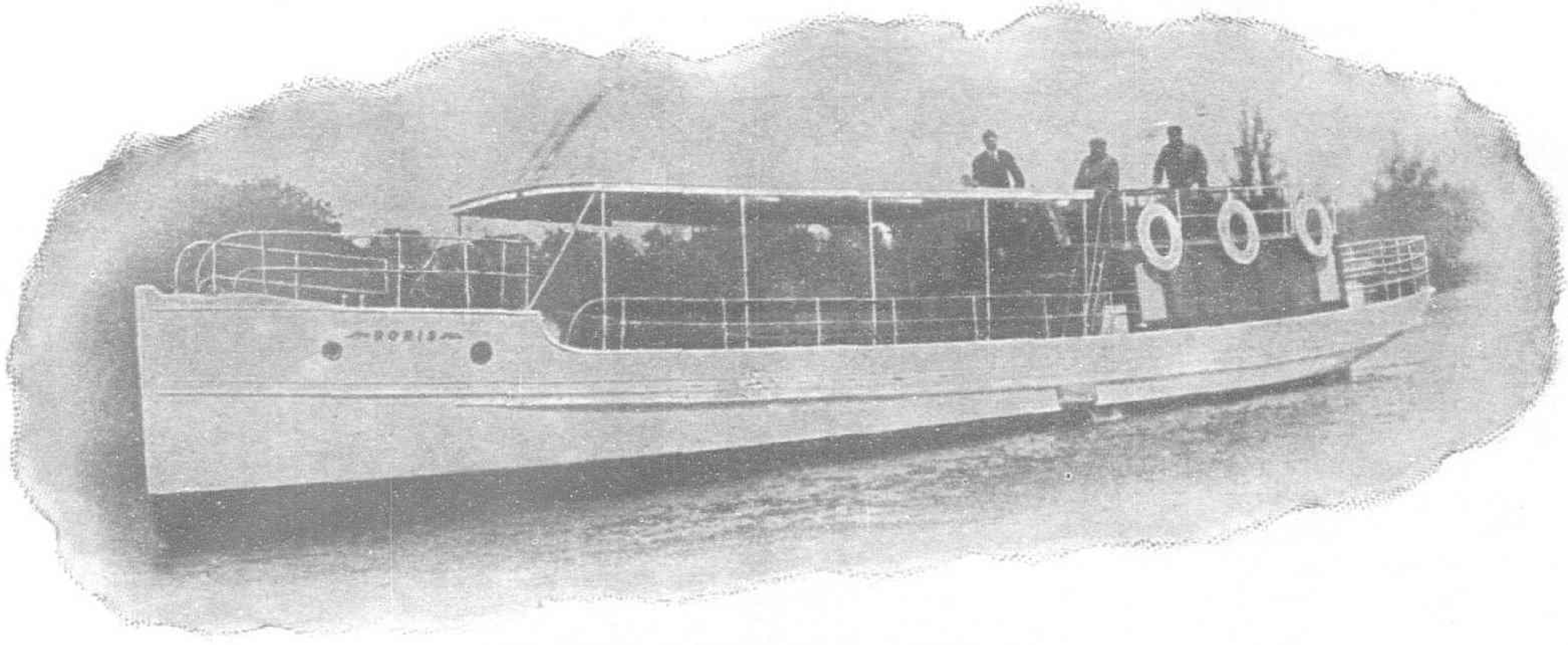

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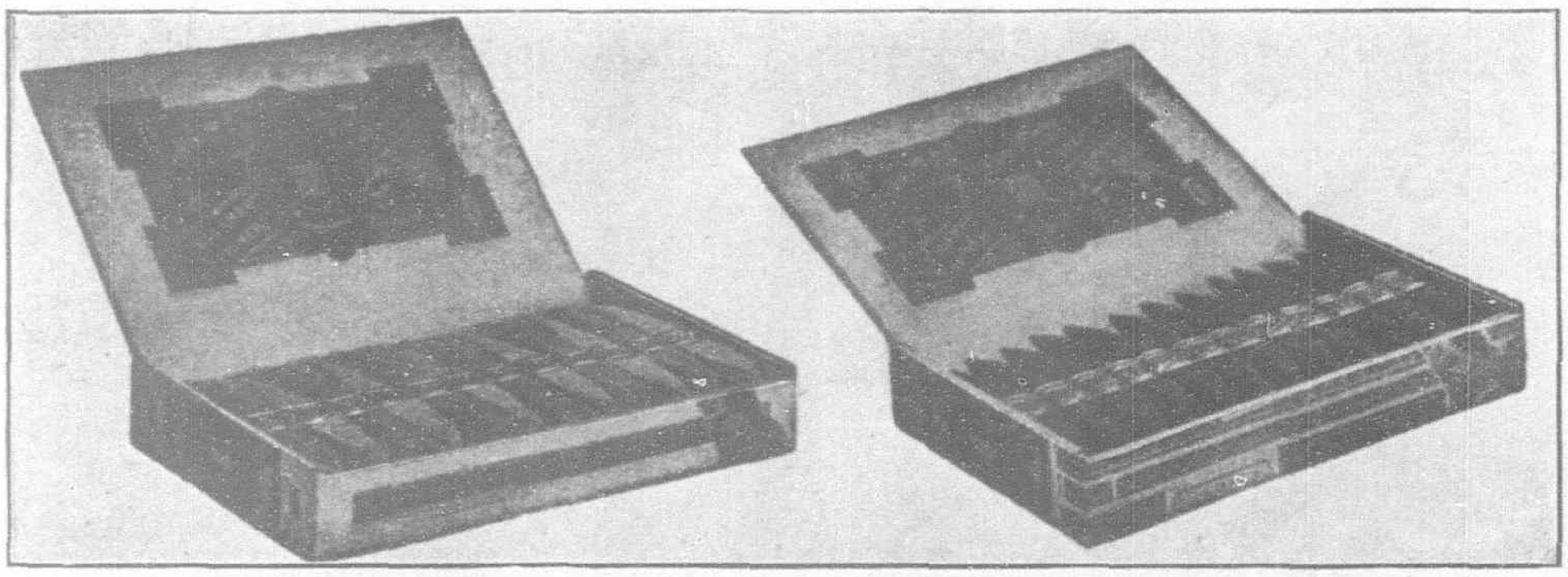

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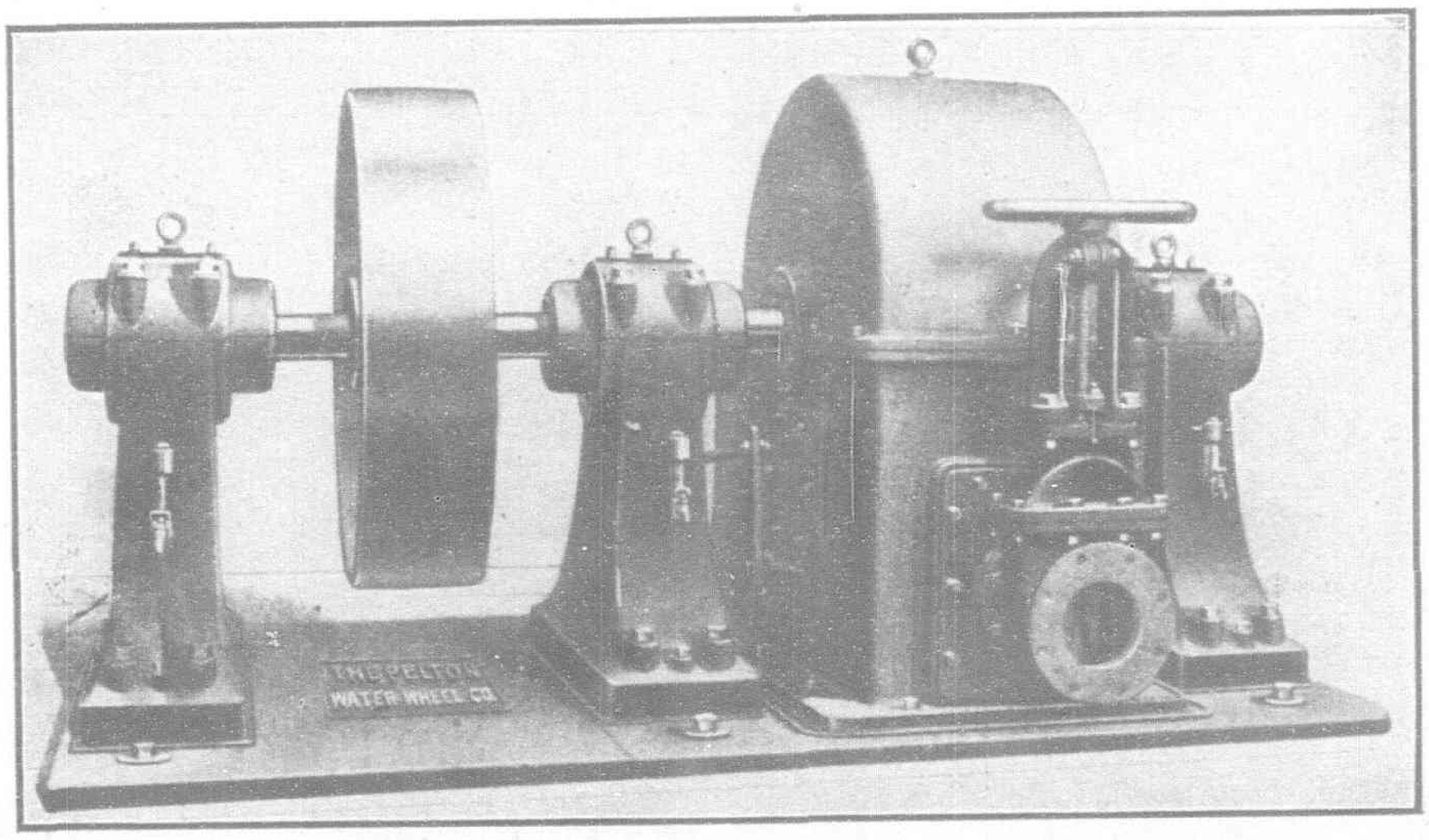

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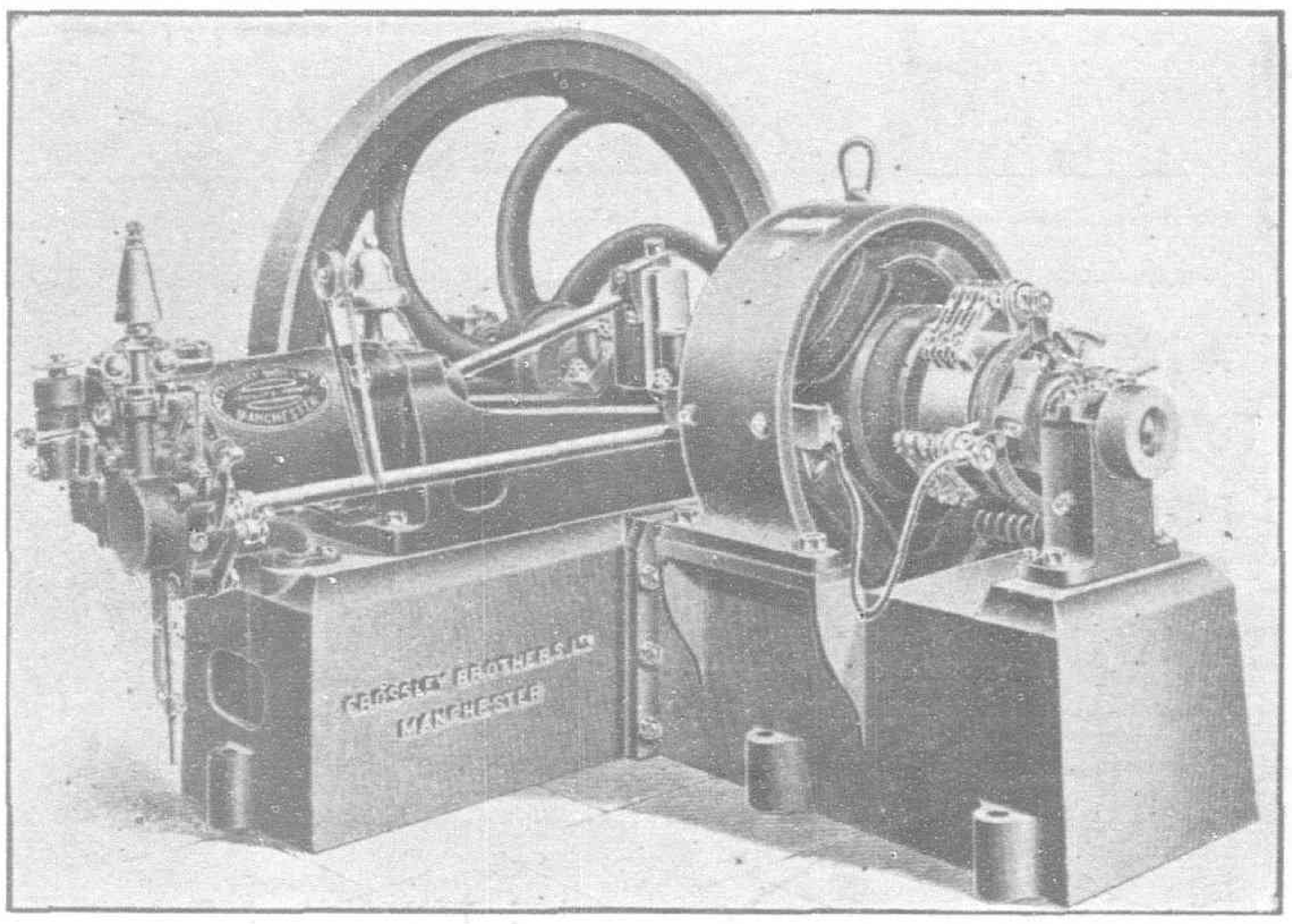

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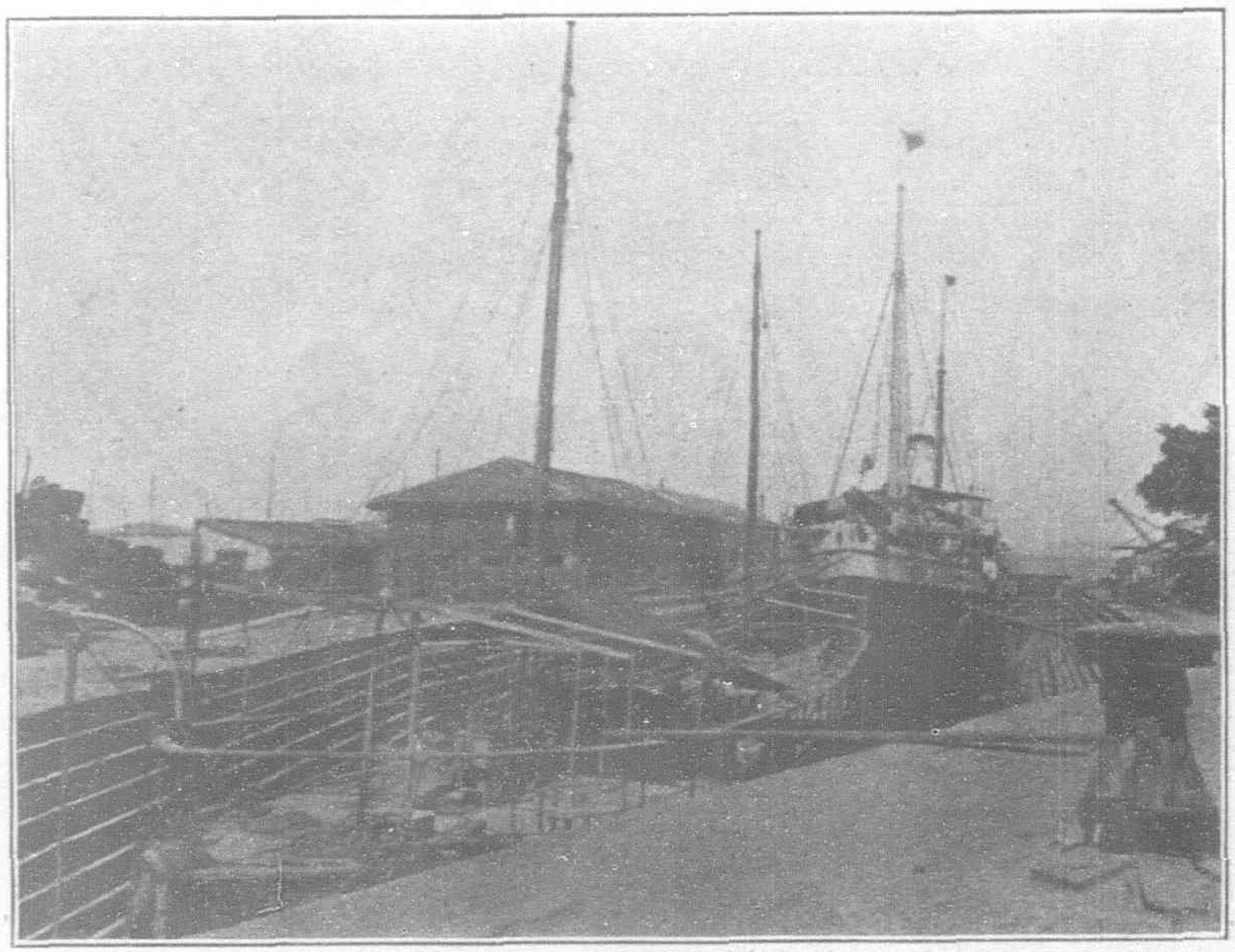

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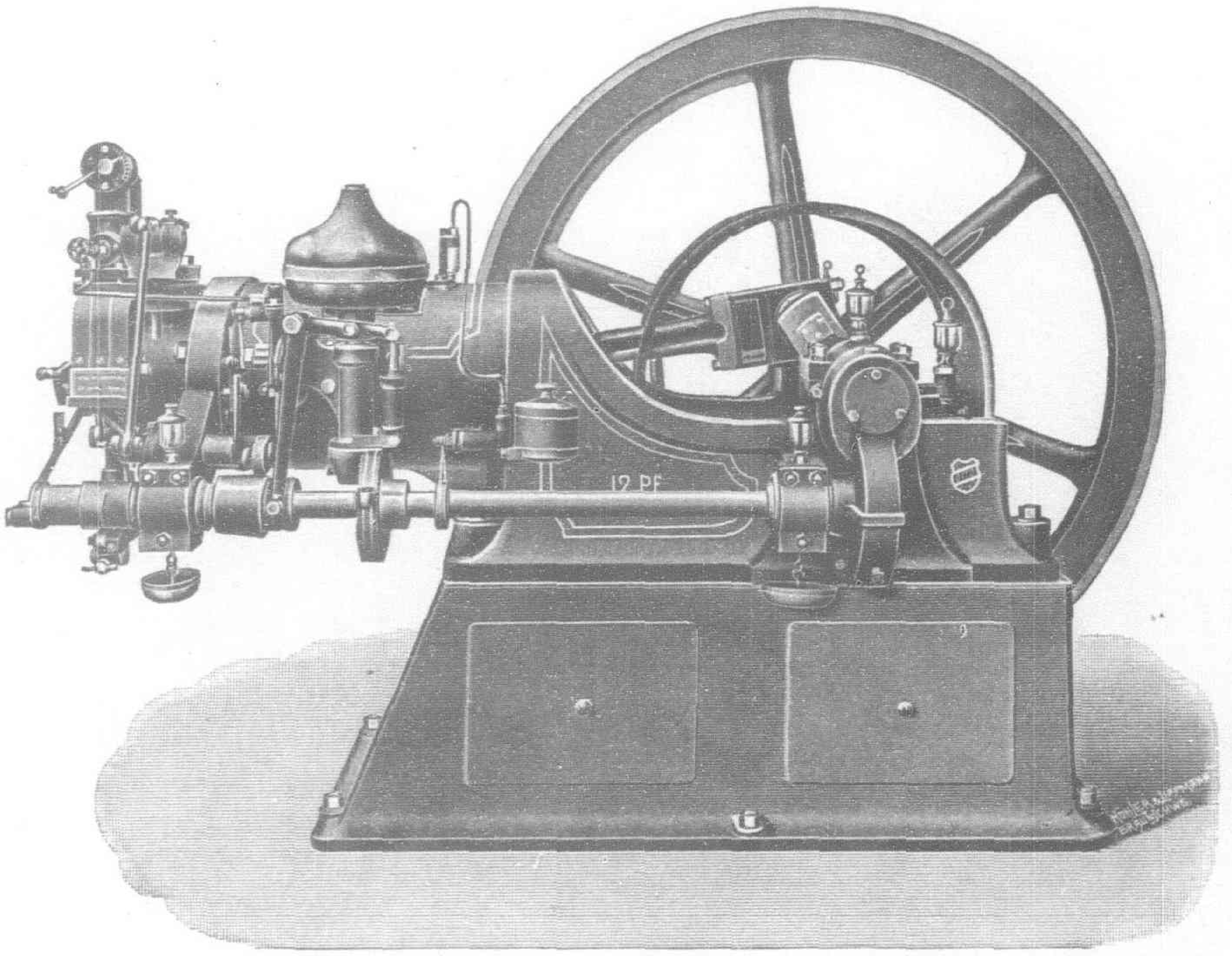

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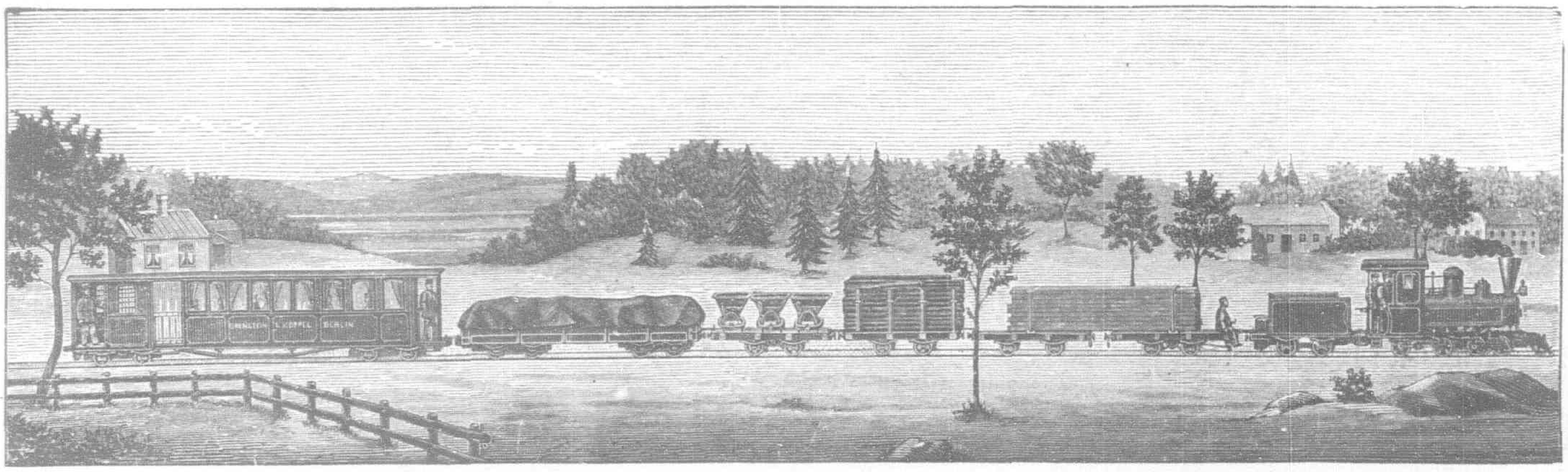

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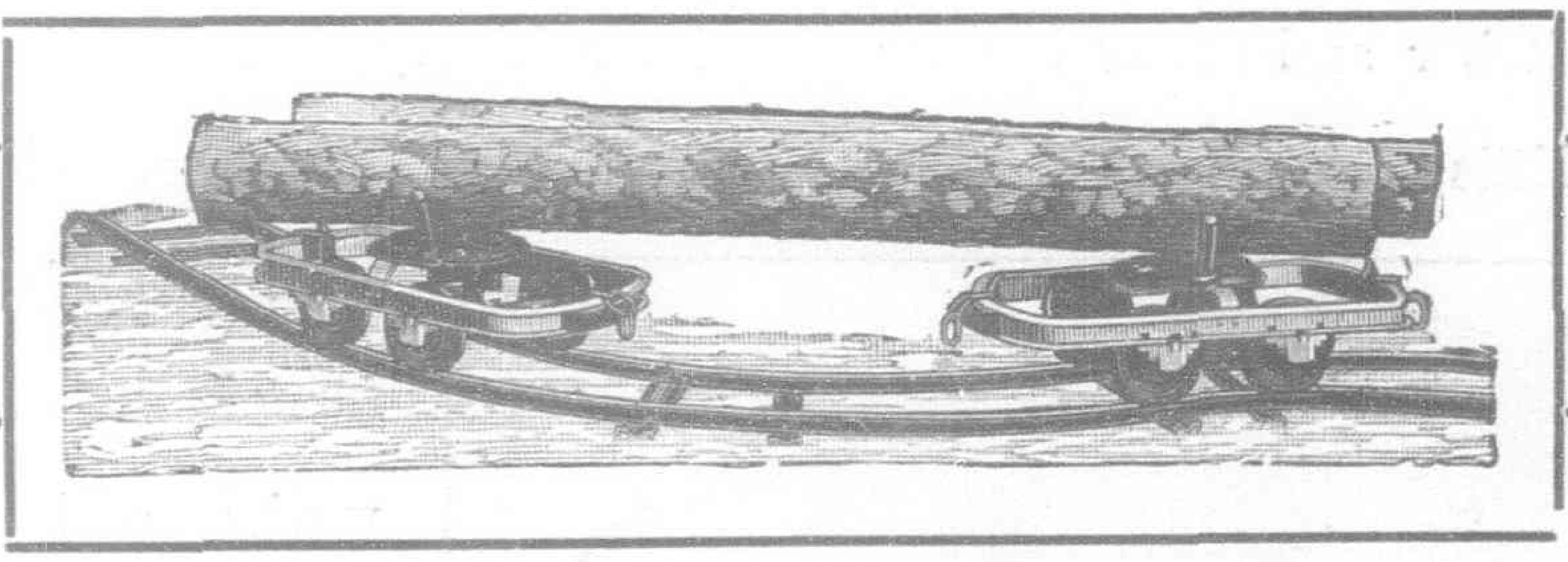

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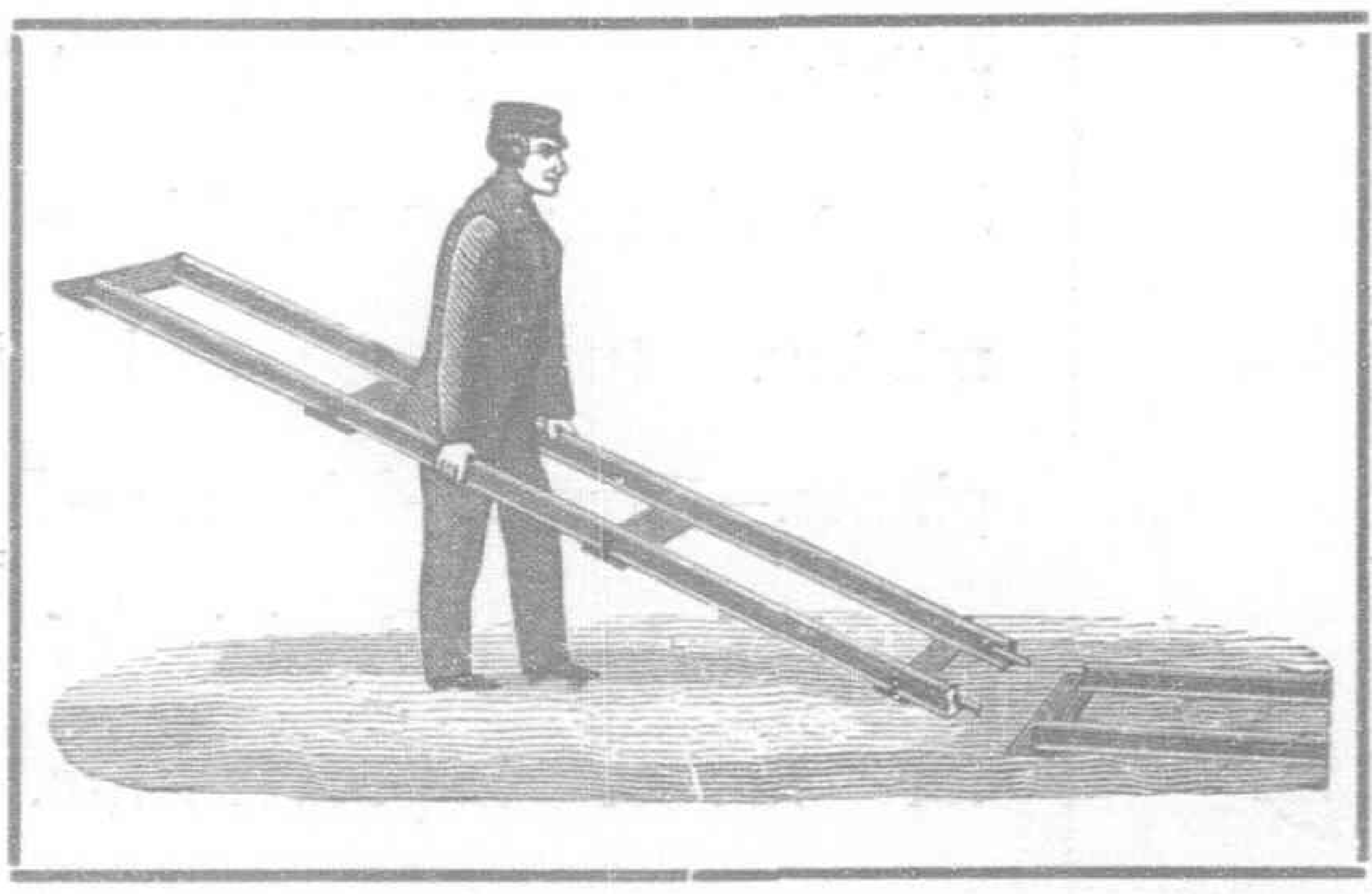

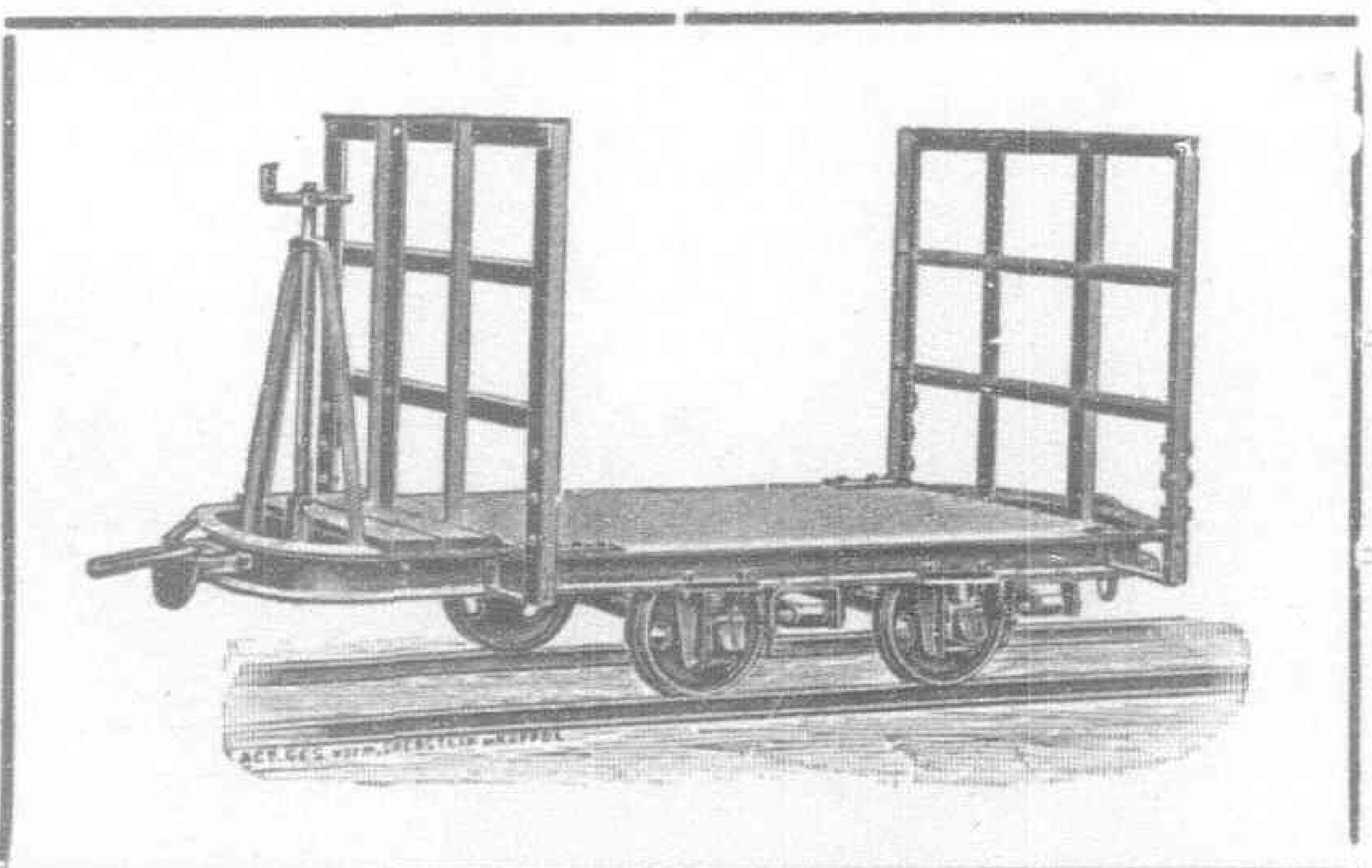

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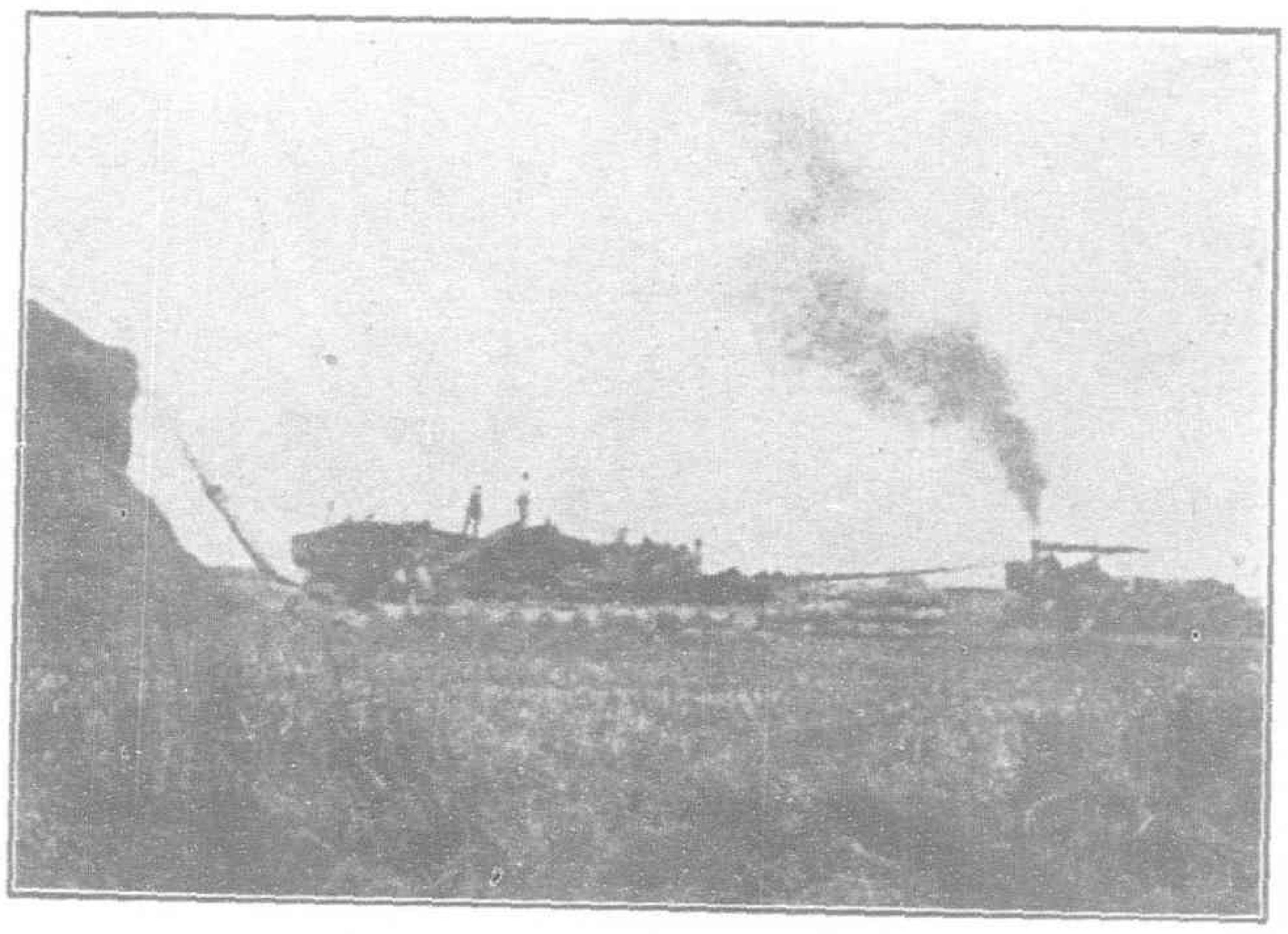

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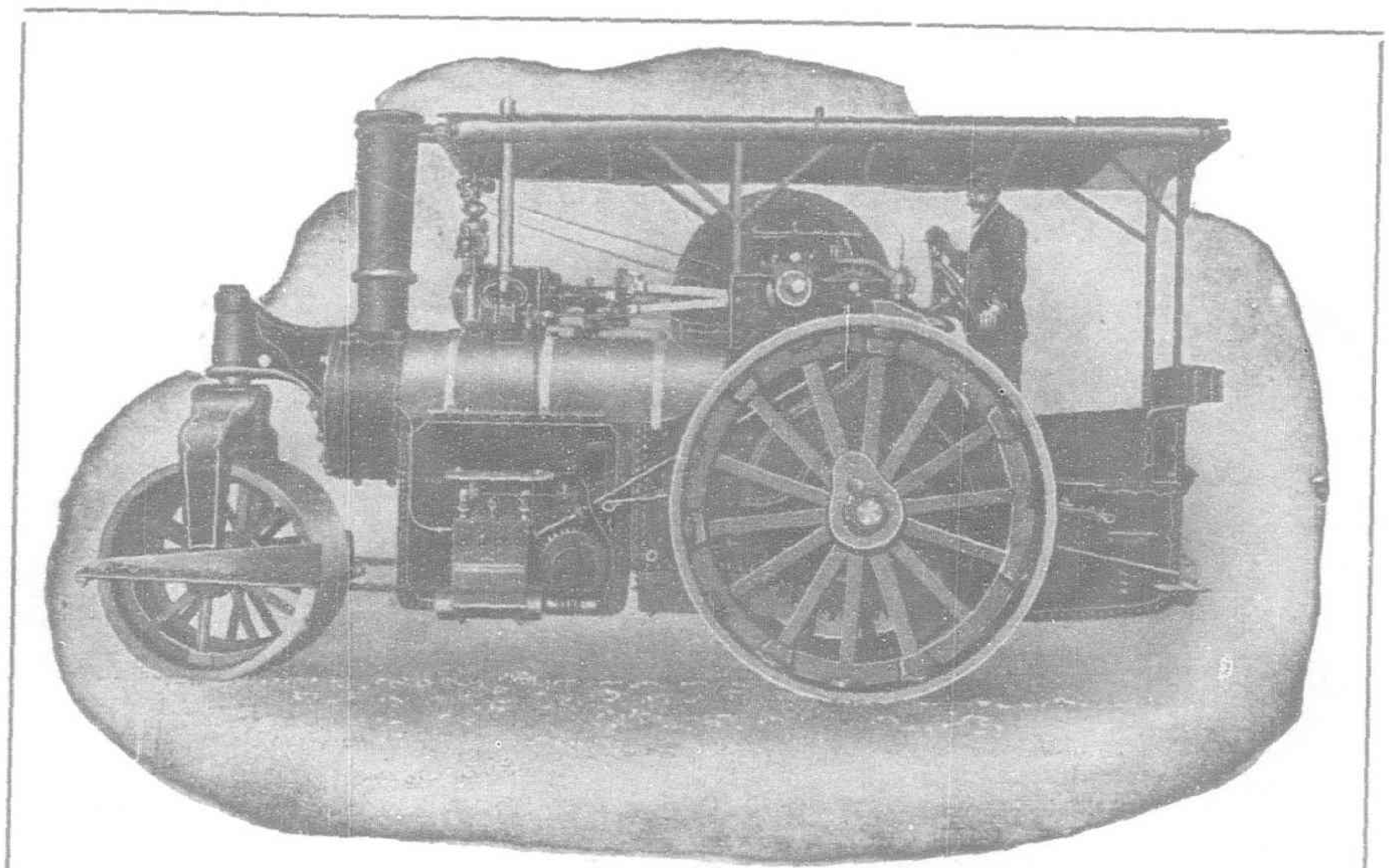

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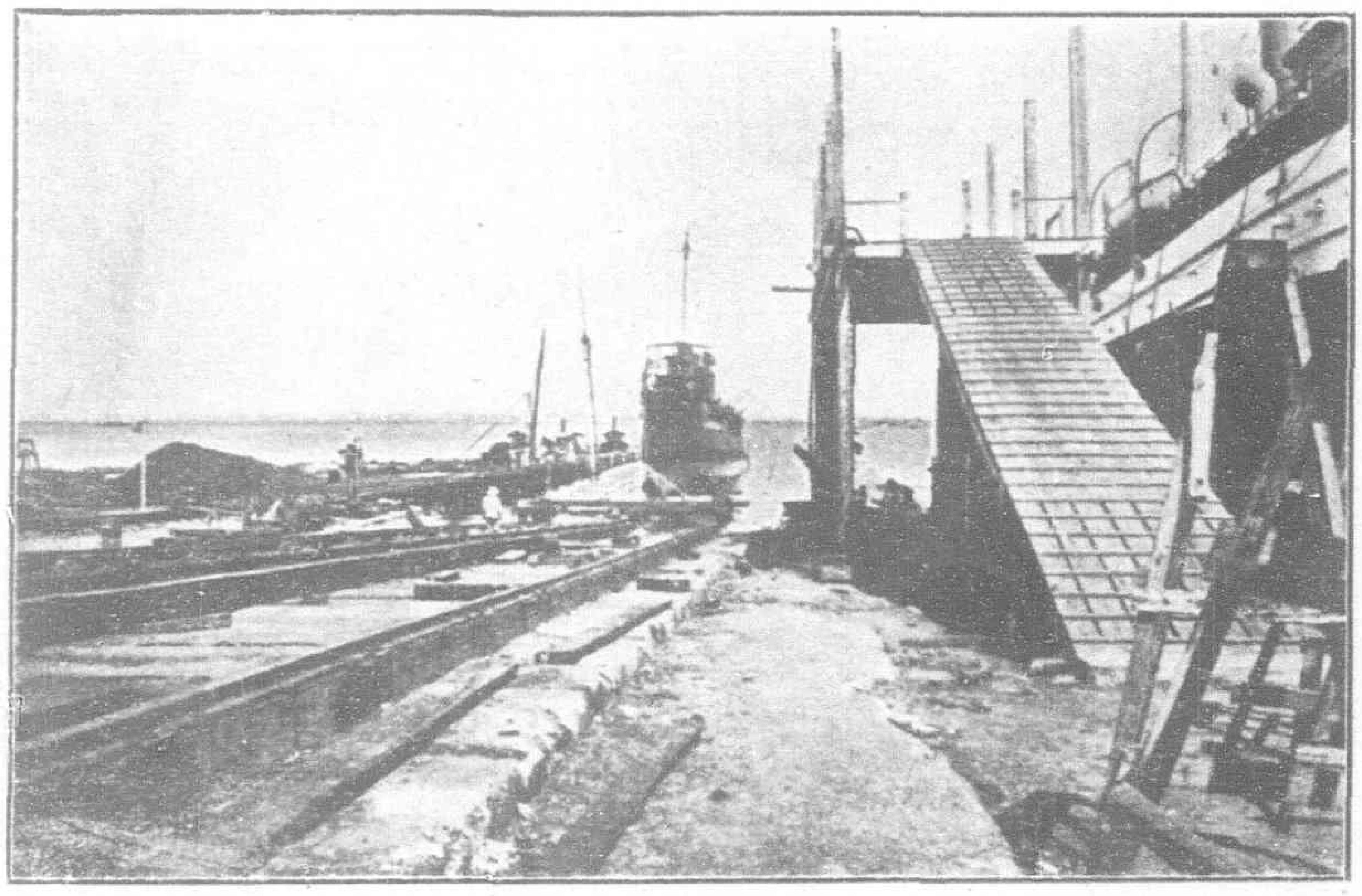

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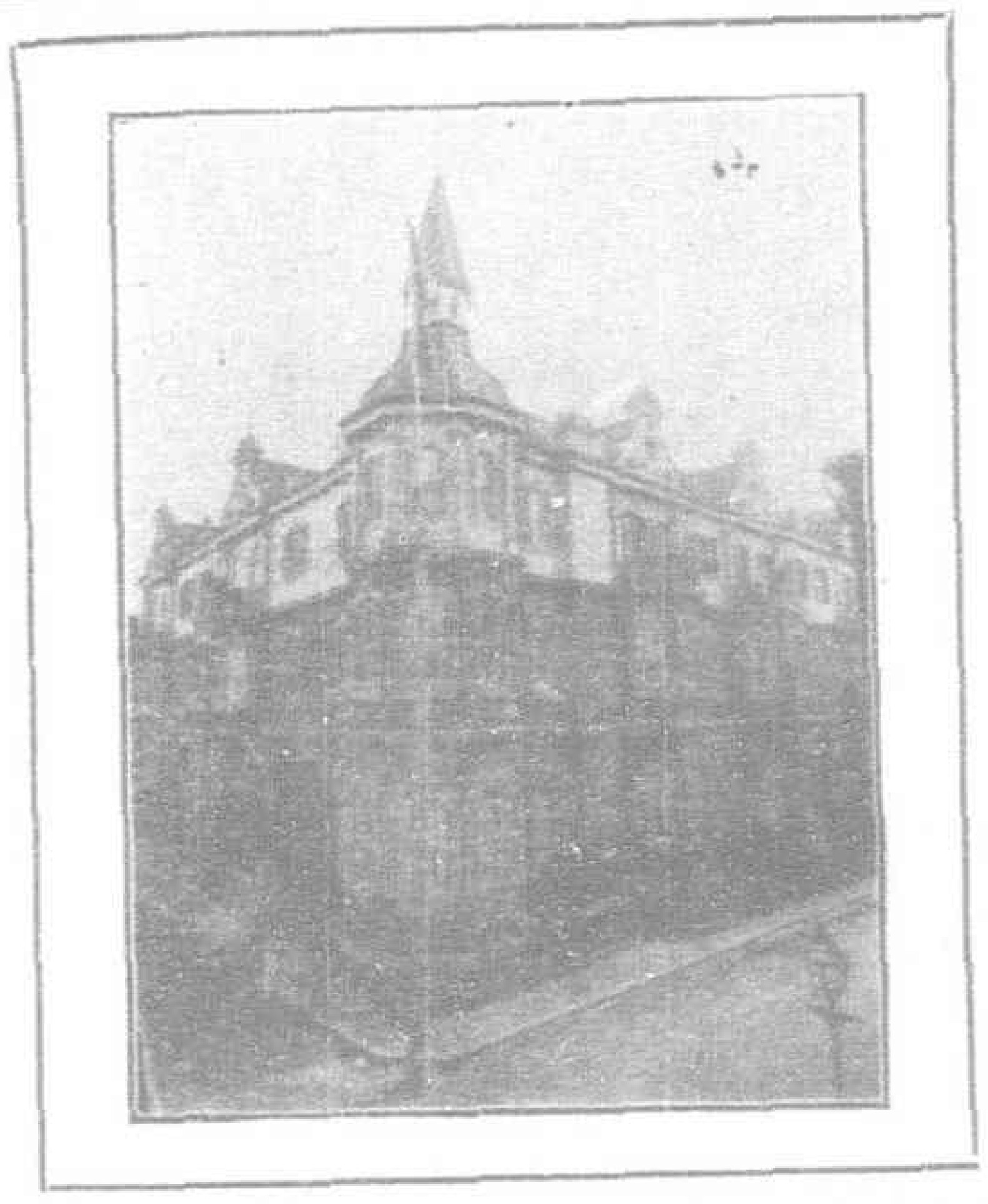

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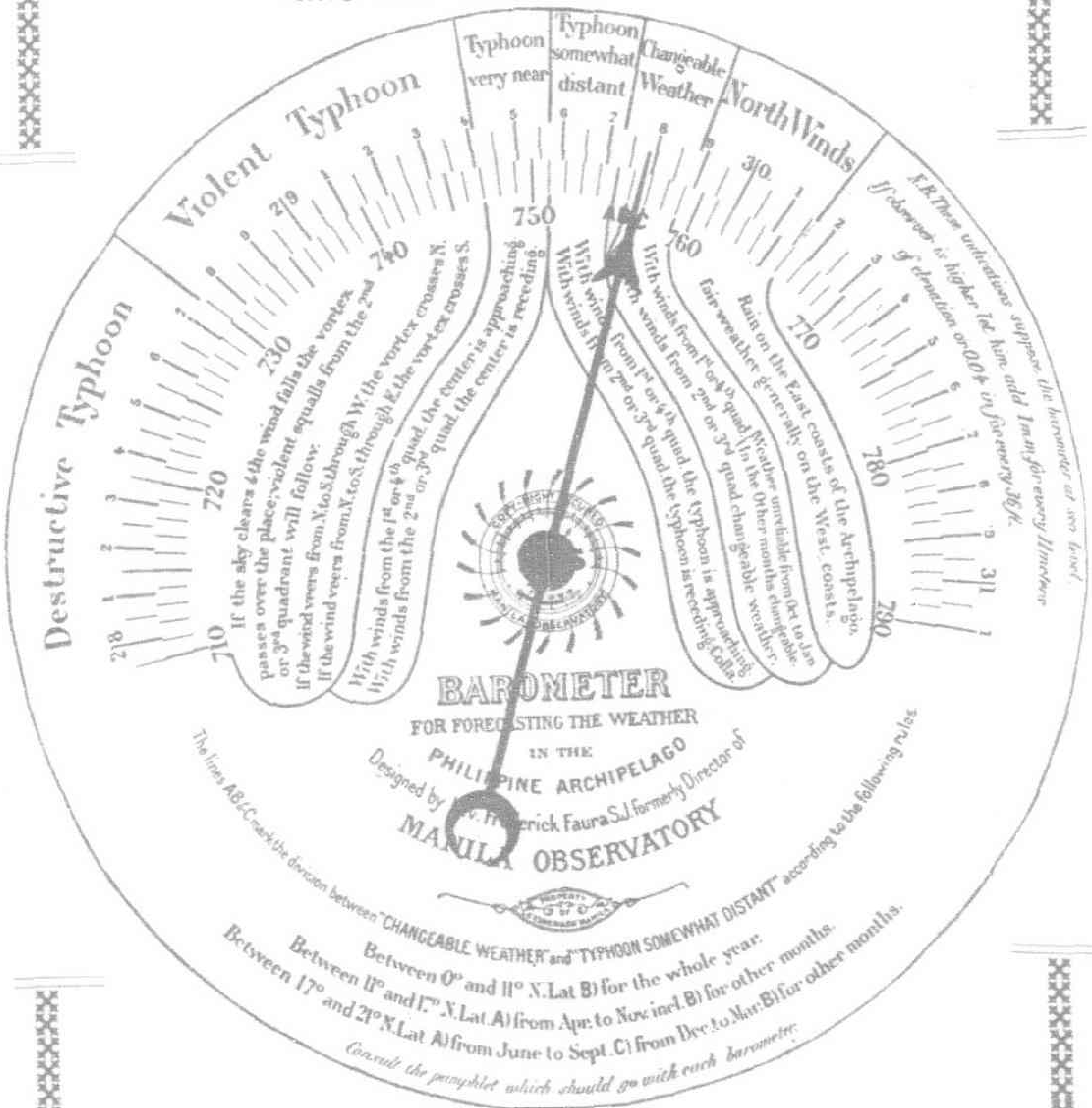
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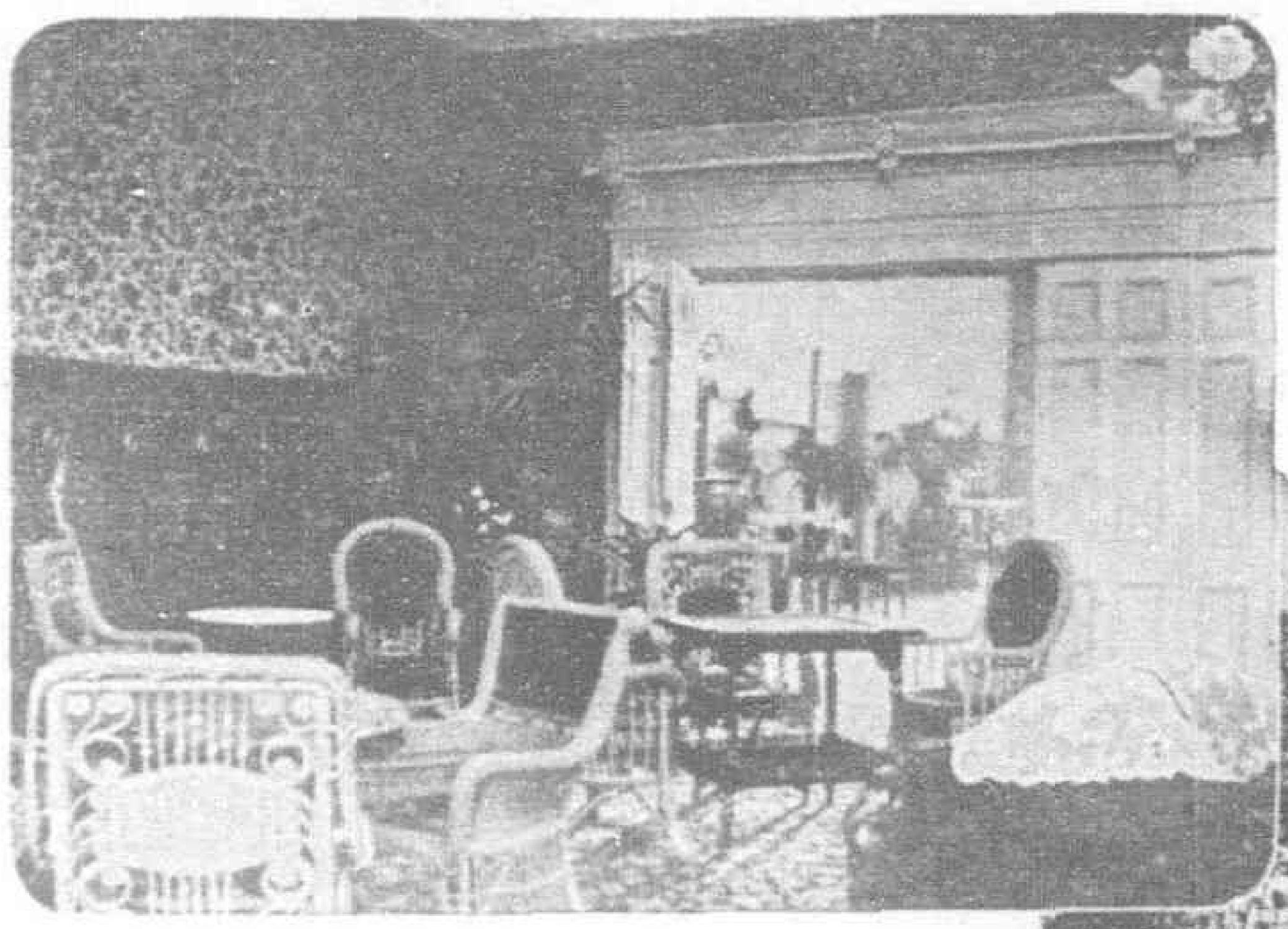

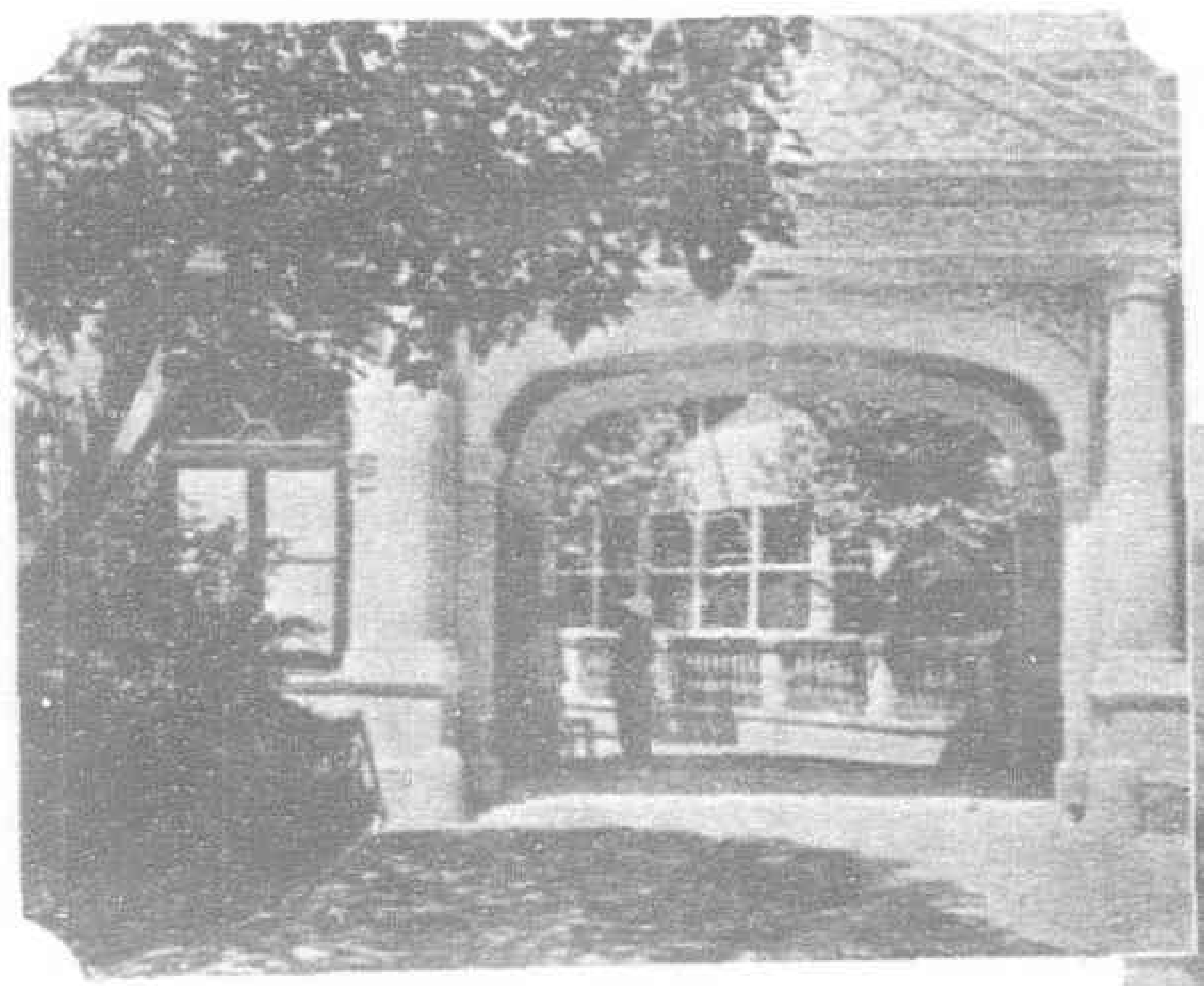

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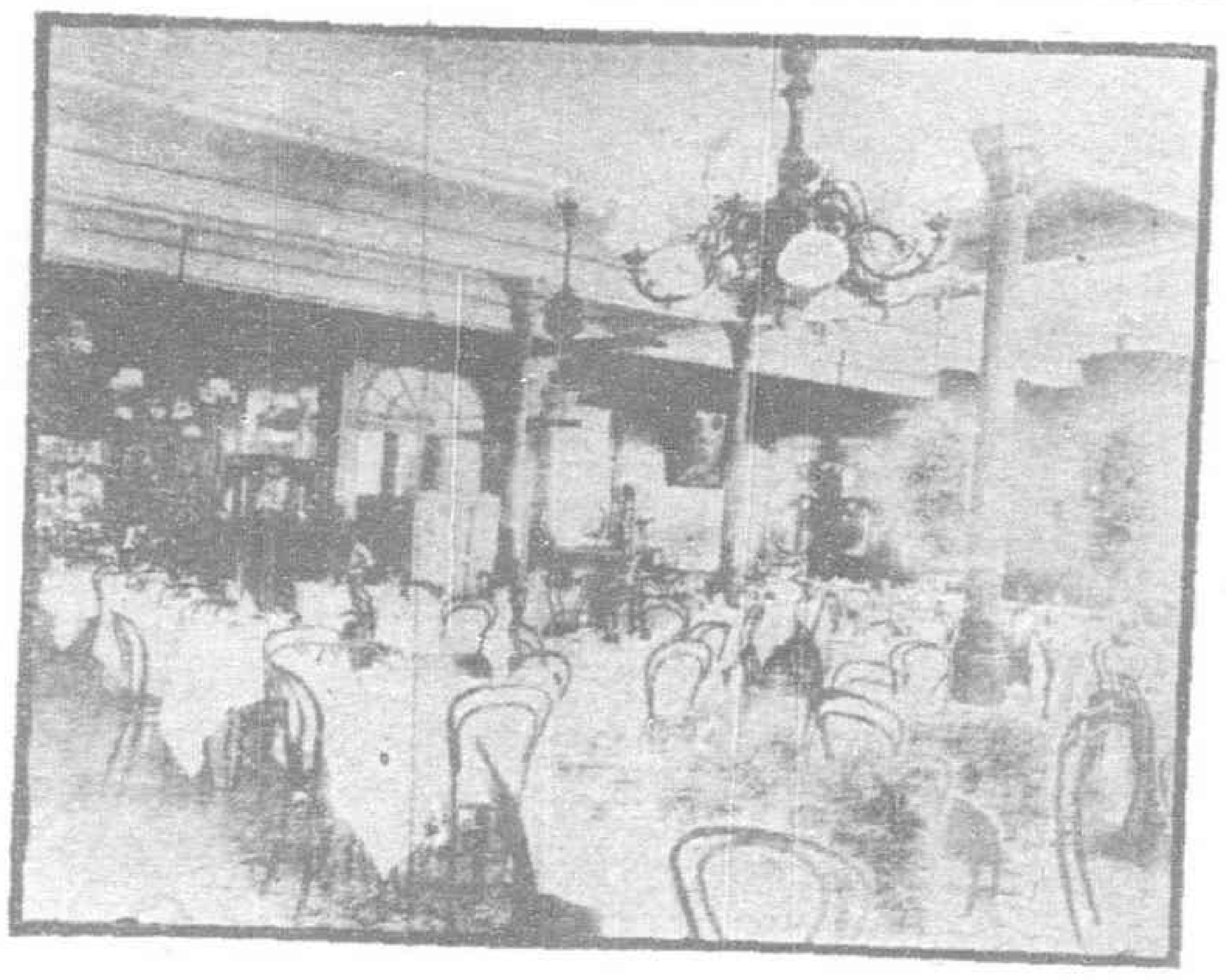

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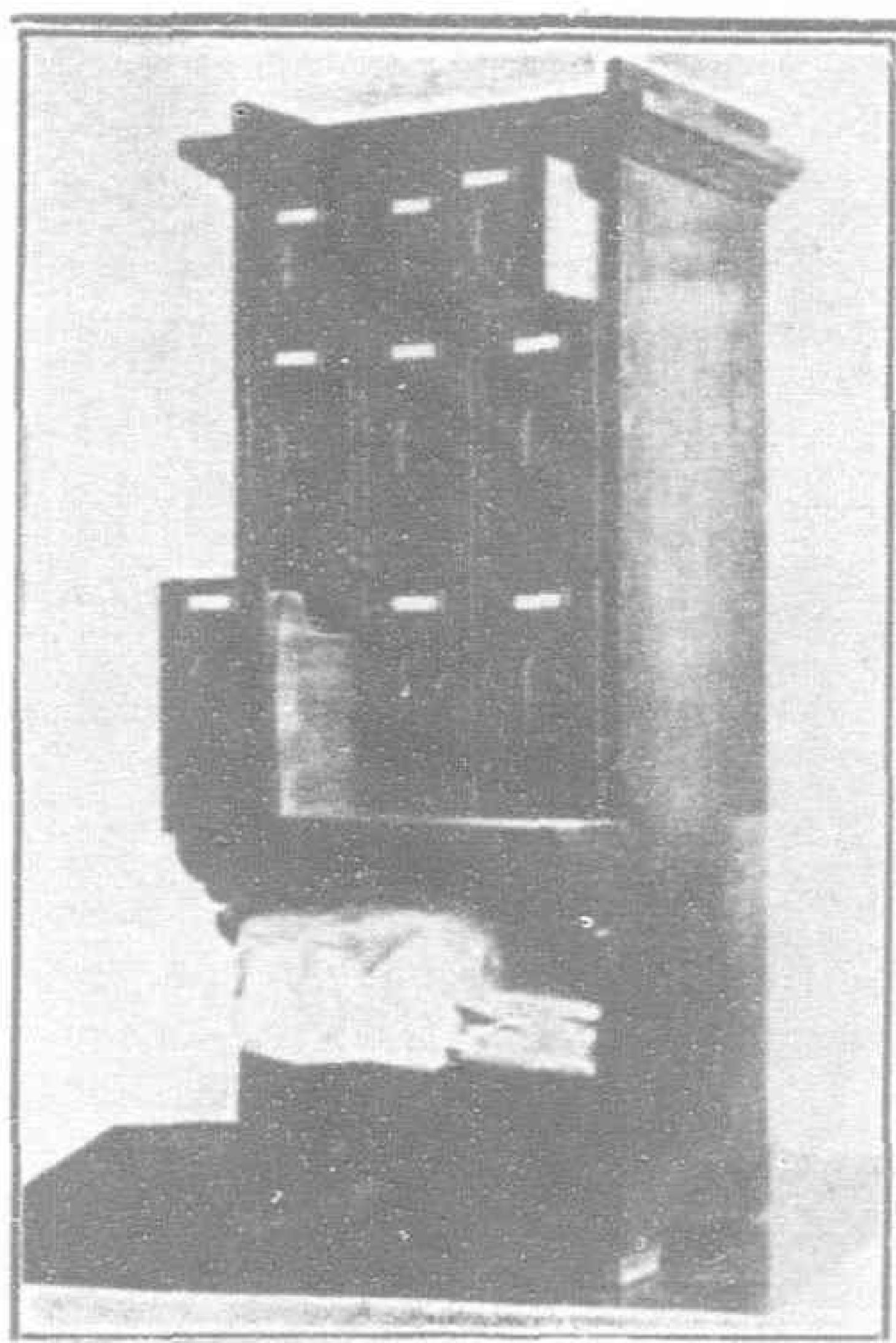

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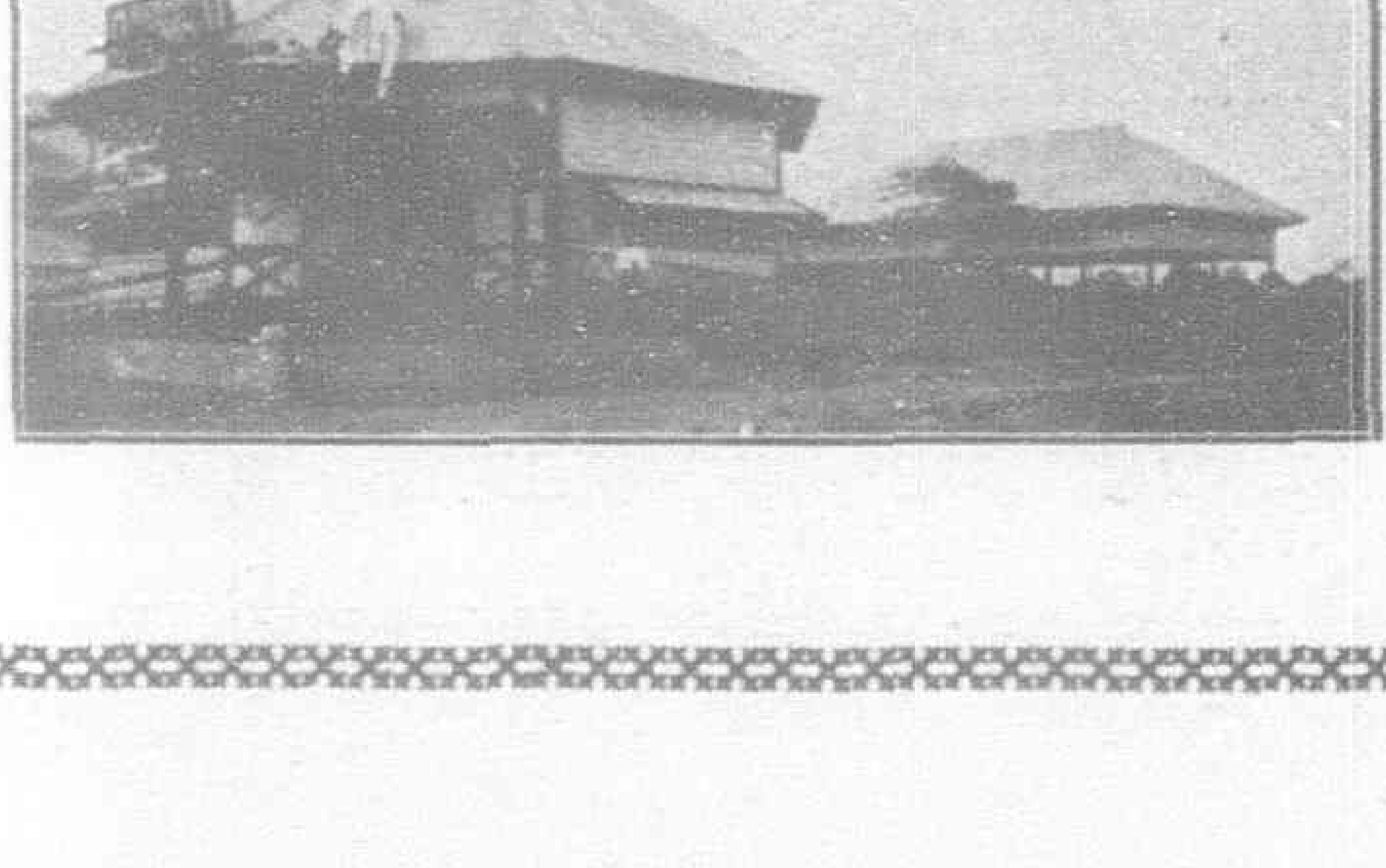

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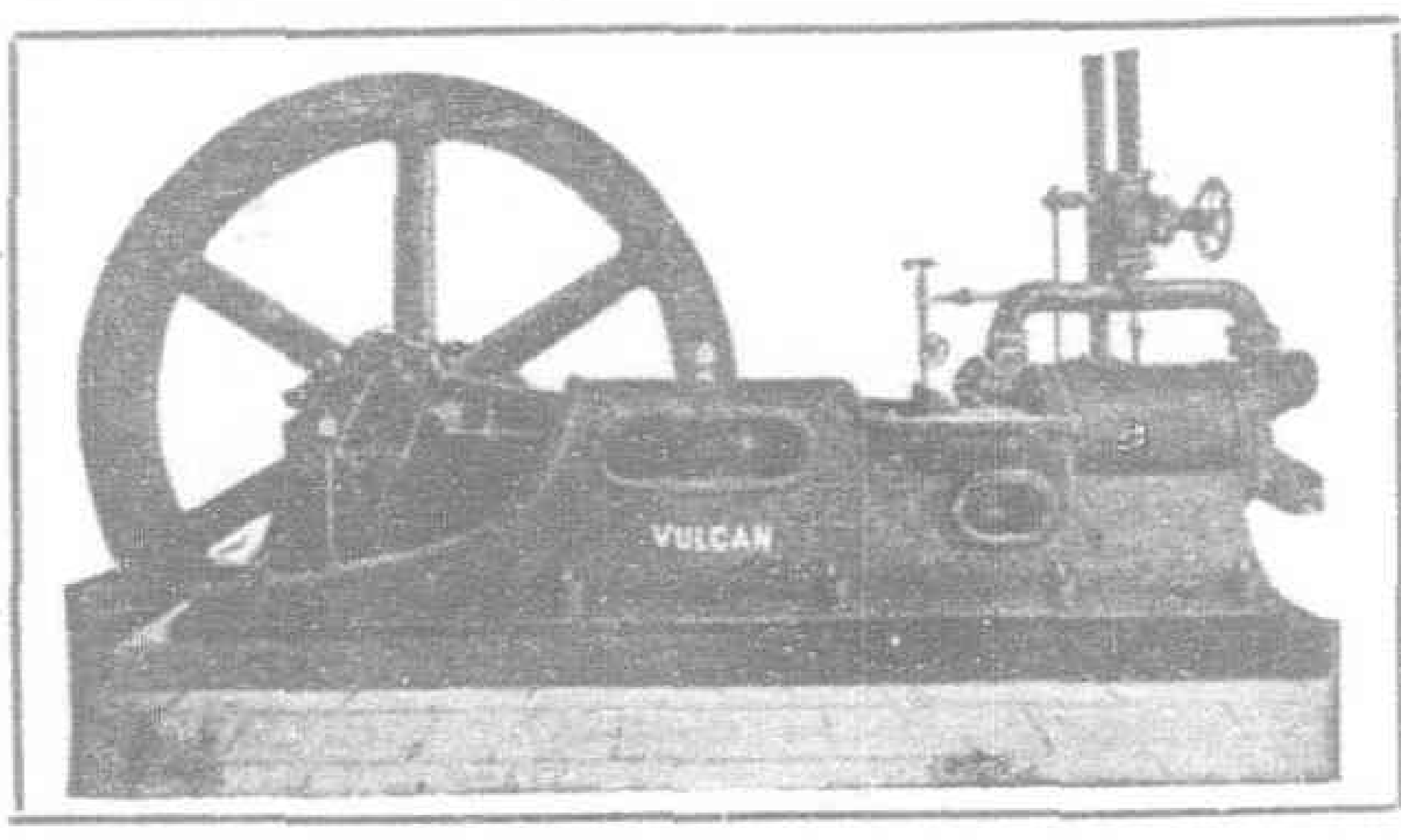

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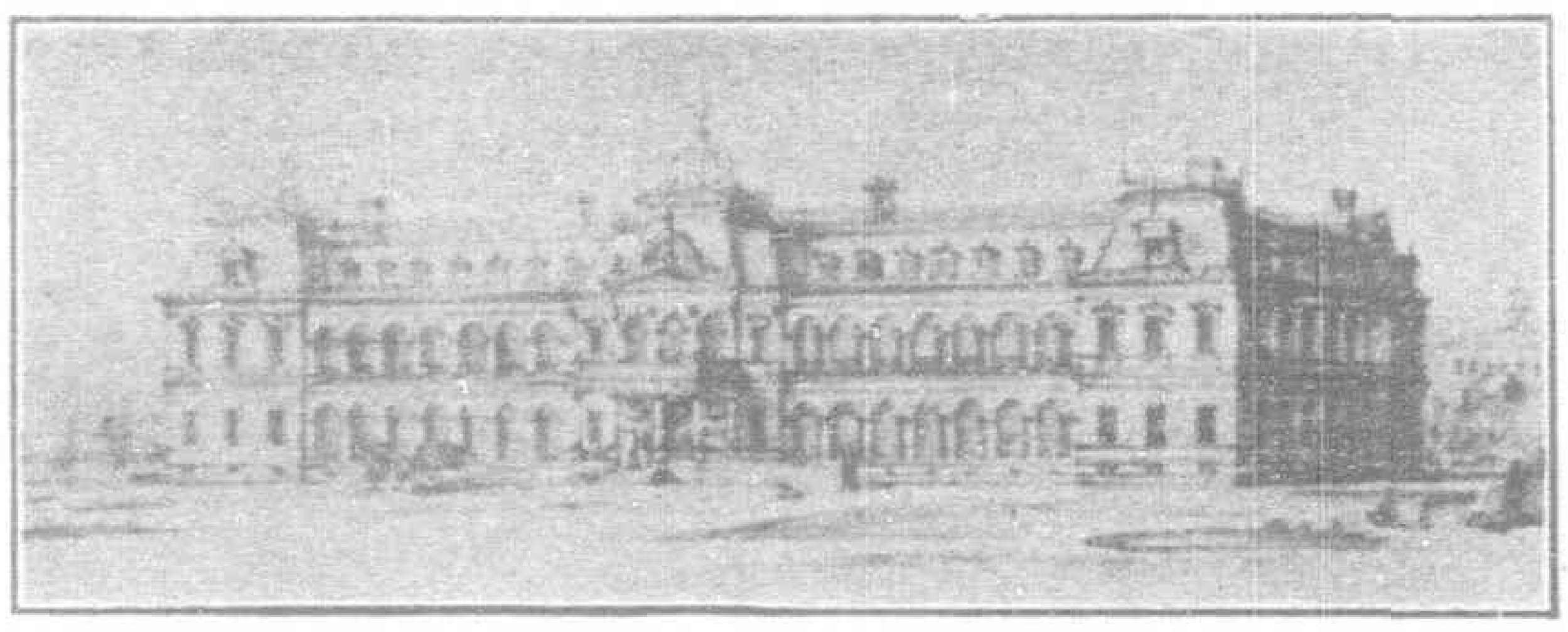

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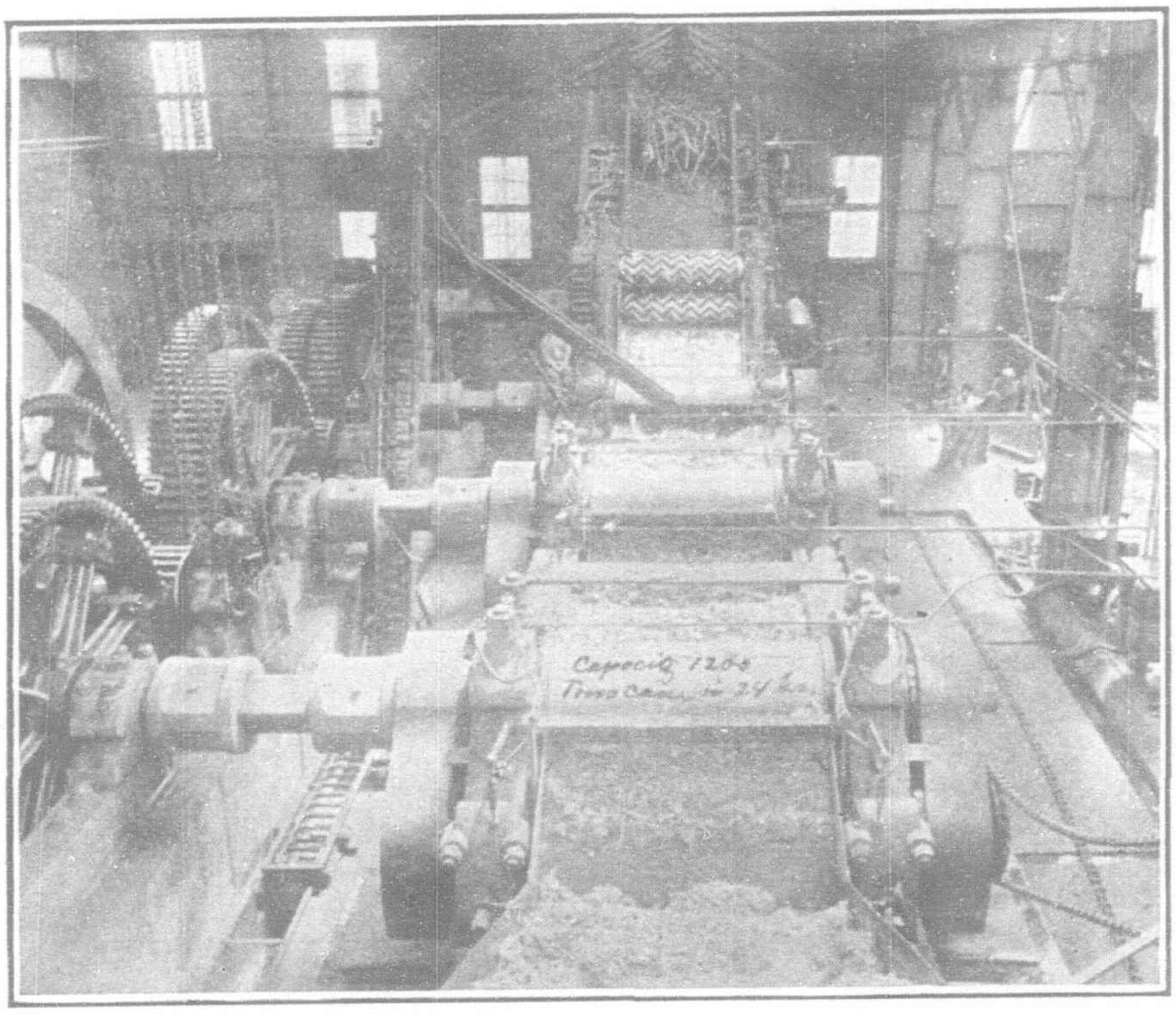

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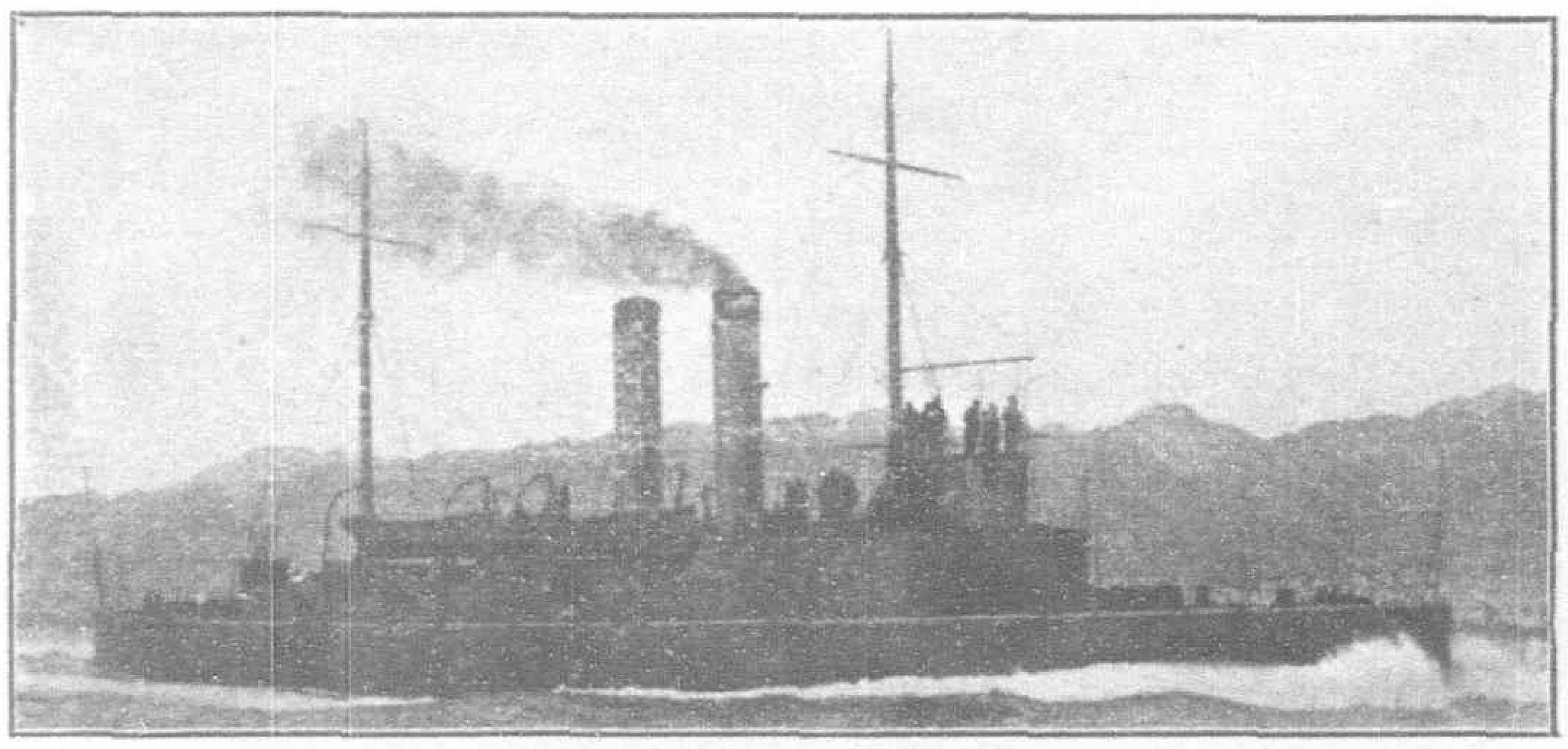

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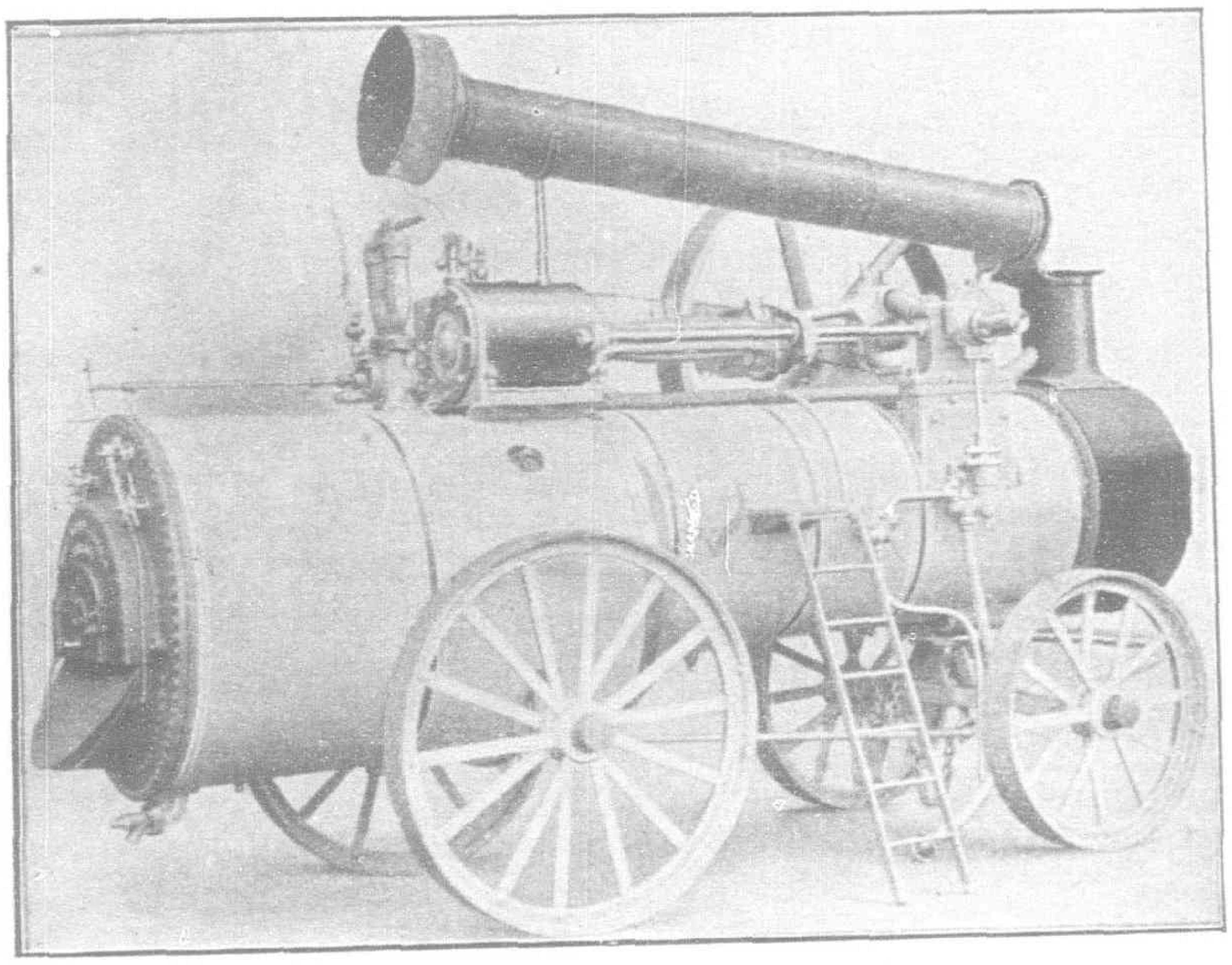

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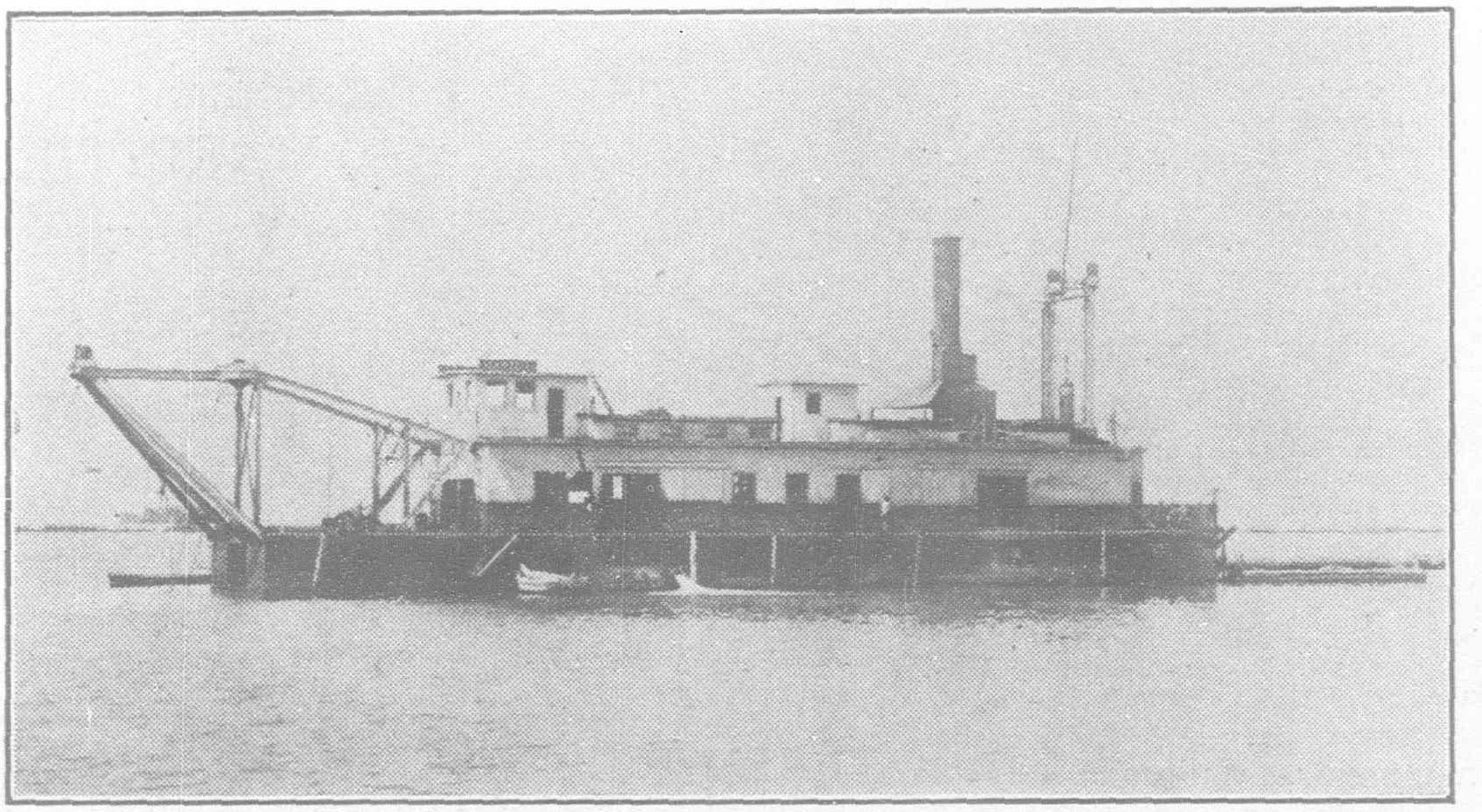

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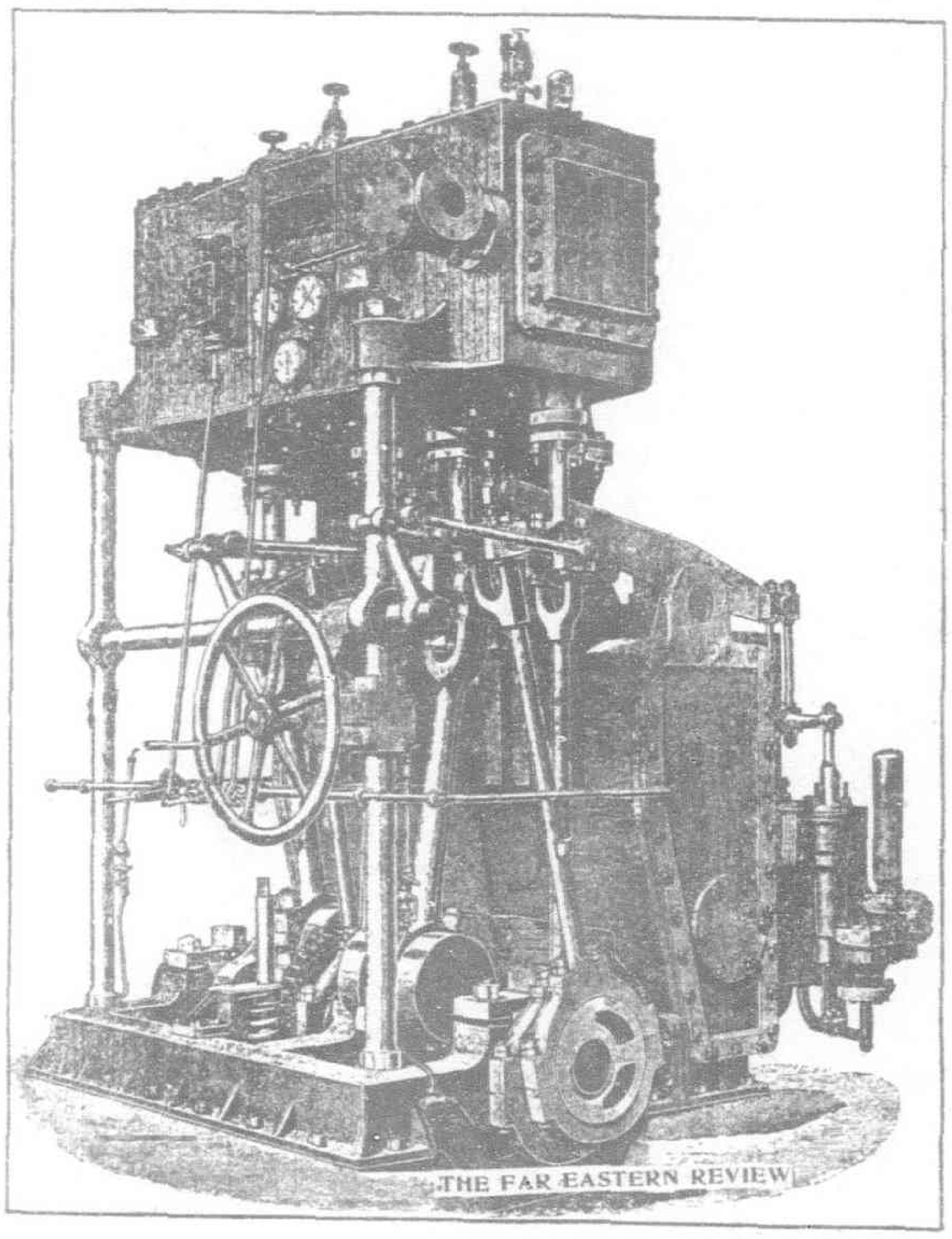

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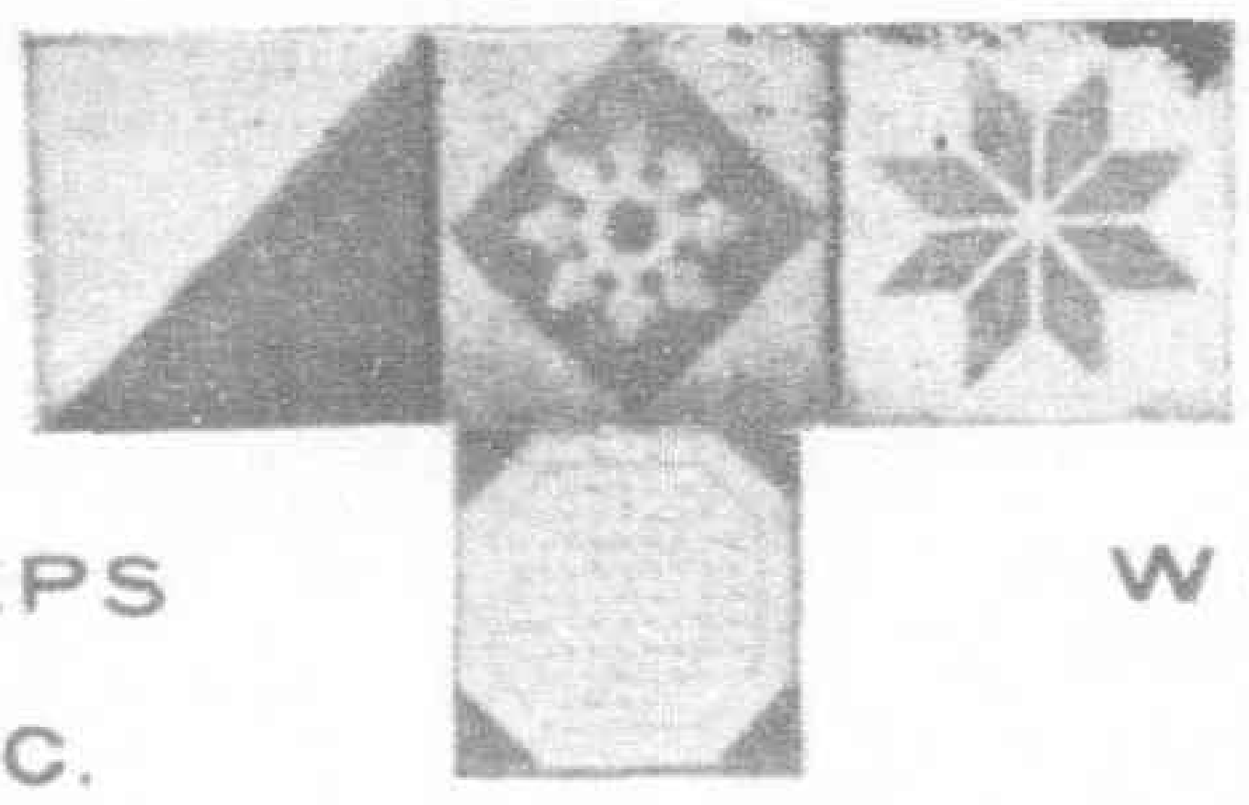

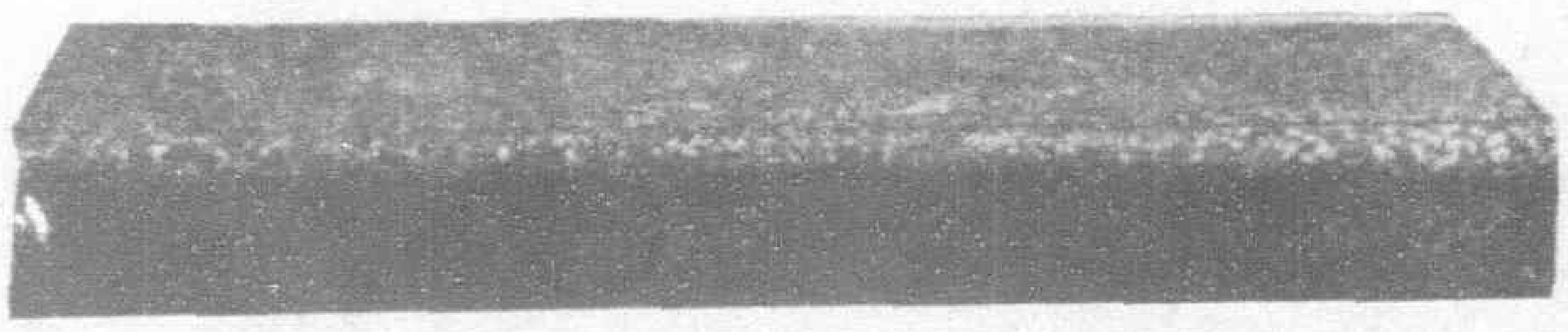

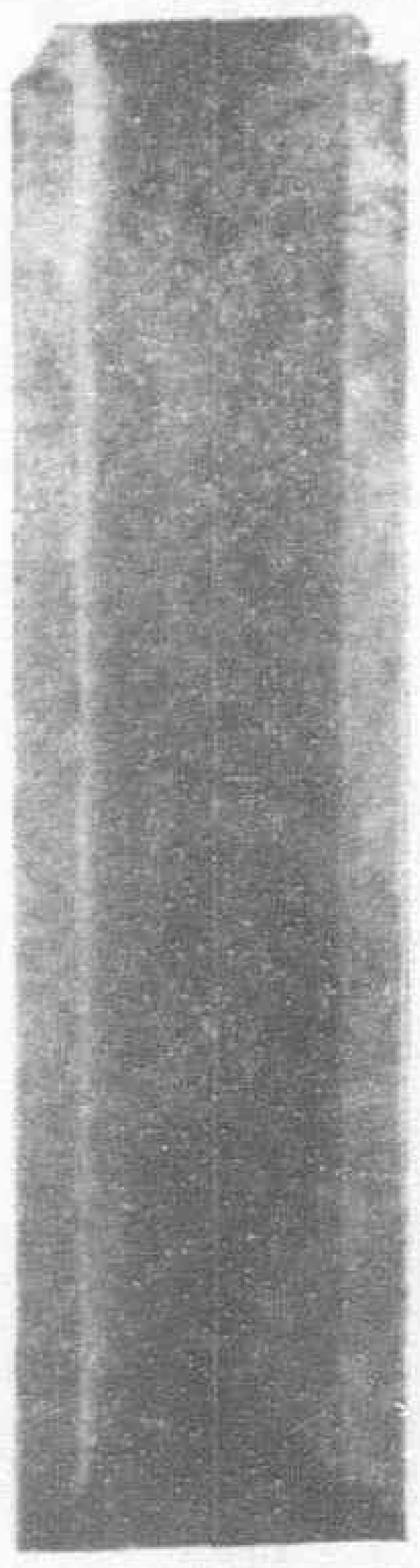

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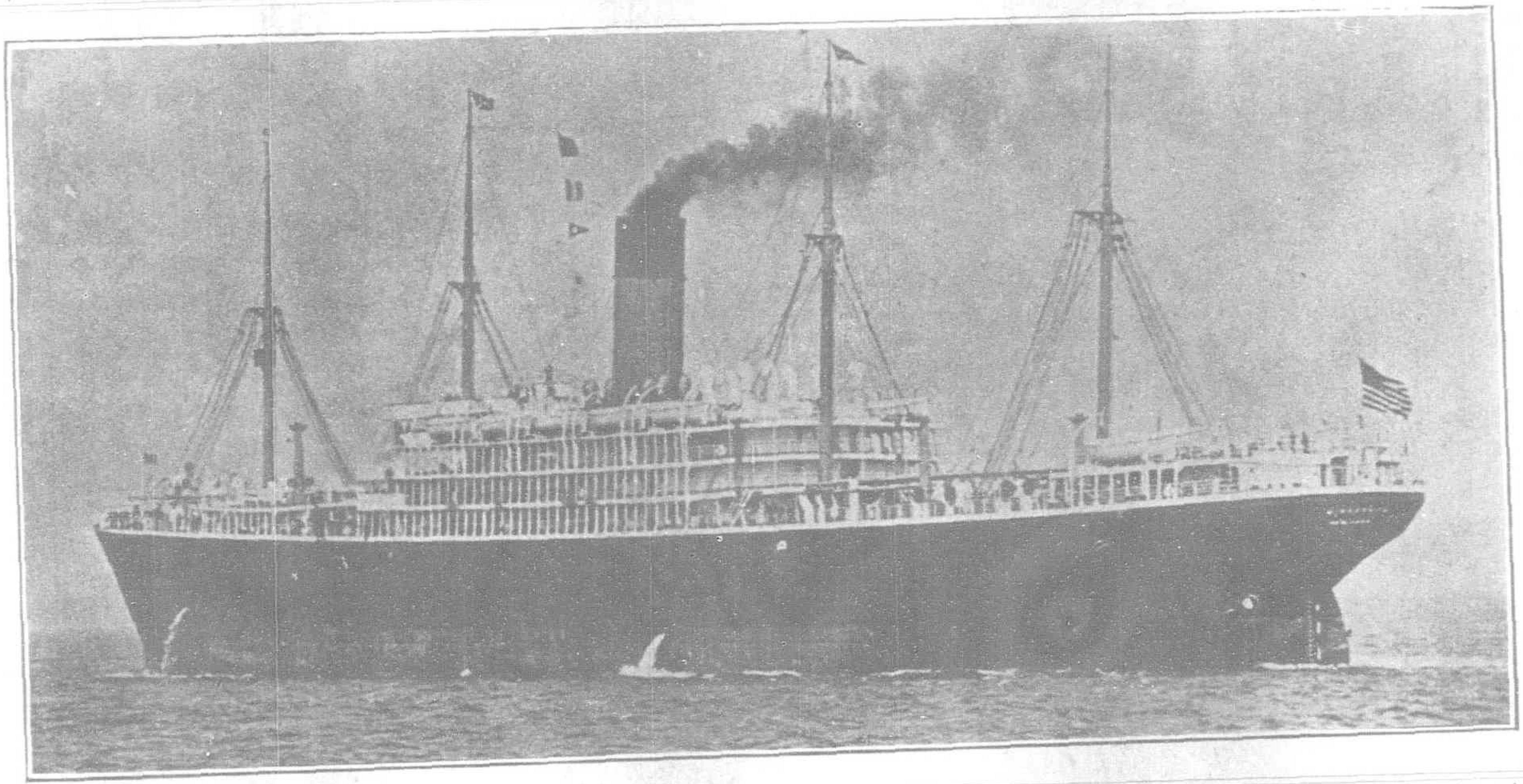

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Oct 20	Nov. 5	Nov. 11	Nov. 17	Nov. 20	Nov. 25	. . DAKOTA . .	5	Oct. 16	Oct. 20	Oct. 23	Oct. 26	Oct. 29	Nov. 13
Nov. 28	Dec. 14	Dec. 20	Dec. 26	Dec. 29	Jan. 3	. MINNESOTA .	8	Dec. 3	Dec. 7	Dec 10	Dec. 13	Dec. 16	Dec. 31
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